REPORT RESUMES

ED 013 639 JC 670 875

PLANNING, PROGRAMMING, DESIGNING THE COMMUNITY COLLEGE, PROCEEDINGS OF A CONFERENCE SPONSORED BY THE COLLEGE OF ARCHITECTURE AND URBAN PLANNING AND THE CENTER FOR THE DEVELOPMENT OF COMMUNITY COLLEGE EDUCATION (UNIVERSITY OF WASHINGTON, APRIL 24-25, 1967).

BY- SONDALLE, MARVIN F.

WASHINGTON UNIV., SEATTLE,

PUB DATE JUL 67

EDRS PRICE MF-$0.75 HC-$5.76 144P.

DESCRIPTORS- *JUNIOR COLLEGES, *EDUCATIONAL FACILITIES, *SCHOOL ARCHITECTURE, *BUILDING DESIGN, *COLLEGE BUILDINGS, CAMPUSES, ARCHITECTURE,

PARTICIPANTS AT THIS CONFERENCE DEFINED THE ESSENTIAL MAJOR STEPS IN FACILITY PLANNING FOR A NEW CAMPUS AS SITE SELECTION, FINANCIAL PROGRAMMING, CAMPUS PLANNING, AND CONSTRUCTION. THEY ALSO AGREED THAT THE COLLEGE ADMINISTRATION AND THE ARCHITECTURAL STAFF MUST WORK TOGETHER AT EVERY STAGE OF THE PROGRAM. PRESENT TECHNIQUES OF ENROLLMENT PREDICTION PERMIT REASONABLE CERTAINTY IN PLANNING TO MEET A COLLEGE'S BUILDING REQUIREMENTS, AND WITH THE CURRENT MODULAR CONCEPT OF CONSTRUCTION, FACILITIES CAN BE DESIGNED NOT ONLY FOR IMMEDIATE USE AND FUTURE EXPANSION, BUT ALSO FOR EASE OF ALTERATION TO SUIT CHANGES IN PROGRAMS. AS A LAST STEP, THE FINISHED FACILITY SHOULD BE EVALUATED TO DETERMINE WHETHER IT REALLY FULFILLS BOTH THE PRAGMATIC AND THE AESTHETIC FUNCTIONS EXPECTED OF IT. (HH)

ERIC

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

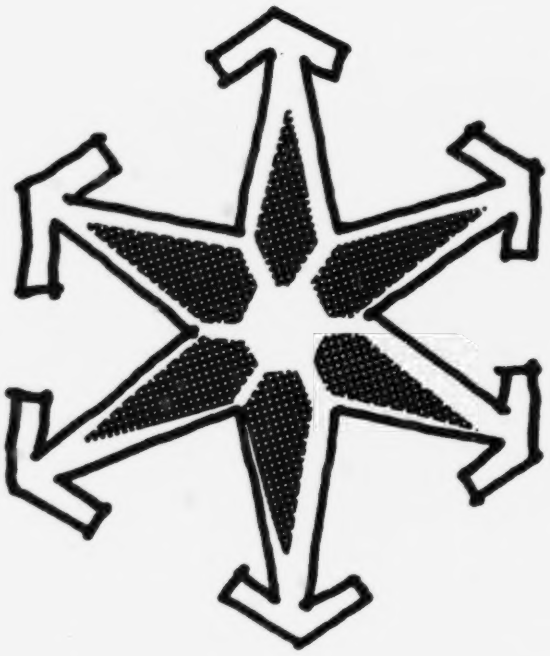
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED013639

UNIVERSITY OF CALIF.
LOS ANGELES

OCT 6 1967

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION



PLANNING, PROGRAMMING, DESIGNING THE COMMUNITY COLLEGE

PROCEEDINGS

APRIL 24-25, 1967

SPONSORED BY THE COLLEGE OF ARCHITECTURE AND URBAN PLANNING AND THE
CENTER FOR THE DEPARTMENT OF COMMUNITY COLLEGE EDUCATION
UNIVERSITY OF WASHINGTON

JC 670 875

PLANNING, PROGRAMMING, DESIGNING

THE

COMMUNITY COLLEGE

Proceedings of a conference
sponsored by the College of Architecture and
Urban Planning and the Center for the Development
of Community College Education,
University of Washington

April 24-25, 1967

Edited by
Marvin P. Sondalle

Published by
the Center for the
Development of Community College Education

Seattle, Washington
July, 1967

Charts, Diagrams and Photographs: Naramore, Bain, Brady and Johanson, Architects and Engineers, Seattle, Washington, pages 55, 56, 59, 60, 61, 62, 63, 64, 65, 66, 68, 70, 71, 73, 76, 81, 82, 83, 84, 85; William L. Pereira and Associates, pages 98, 99, 101, 102, 104, 106, 107; Marvin Rand, Los Angeles, California, pages 103, 108, 110.

PREFACE

Over 160 years ago the junior college movement had its beginning in this nation.

Though seemingly atypical of the pattern of growth experienced by the common schools in the United States during the same period, the two-year college is nonetheless considered to be the most unique of our educational institutions. Gleazer and Gernhart, in the *1967 Junior College Directory* reported respectively that, "As has been the case for the past several years, . . . the dramatic growth in numbers of institutions and the expanding role of junior colleges in accommodating young people and adults alike (which began) . . . a decade or more ago is obviously continuing."[1] "In 1964, more than one student in every four beginning his program of higher education in the United States enrolled in a junior college. This represented an increase of 106,000 students over the preceding year. It has been estimated that by 1970, there will be 1,000 junior colleges enrolling nearly 2 million students."[2] If this rate continues, it becomes abundantly clear that many existing colleges will be remodeled or added to and that an equal number of new institutions will be needed by the year 2,000.

Never was the need so great for the joining of hands by the educator and the architect in the planning, programming and designing of these institutions. It is particularly true in the Pacific Northwest and especially so in the State of Washington. It is with these facts in hand and this concern in view that the conference was conceived and organized.

It is this type of continuing education program which is vitally needed and which we hope can be sustained in the years ahead. The resources of this great state university belong to the people--it is our charge and our challenge that they be used in a most effective way to improve communication "between the ivory tower and the market place."[3]

Robert H. Dietz, F.A.I.A., Dean
College of Architecture and Urban
Planning

---

[1] E. J. Gleazer, Jr., "Introduction," *1967 Junior College Directory*, William A. Harper (ed.), Washington, D.C.: American Association of Junior Colleges, 1967, p. 5.

[2] J. C. Gernhart, *Ibid.*, p. 6.

[3] H. T. Morse, "Between the Ivory Tower and the Market Place," *Junior College Journal*, 35 (April, 1965), 16.

ACKNOWLEDGMENTS

While this conference was presented under the joint sponsorship of the College of Architecture and Urban Planning and the Center for the Development of Community College Education, its success is due to the efforts, planning and coordination of Raymond C. Schneider, Associate Professor of Architecture, and Frederic T. Giles, Professor of Higher Education and Director of the Center.

Special recognition is given to the United States Steel Corporation for its grant to the College of Architecture and Urban Planning and to the Richard King Mellon Trust for its grant to the Department of Urban Planning which helped to make this activity possible.

Appreciation is extended to Robert H. Dietz, Dean, College of Architecture and Urban Planning; Gordon C. Lee, Dean, College of Education; Norman J. Johnston, Assistant Dean, College of Architecture and Urban Planning; and Frederic T. Giles, for their excellent performances in presiding over the various sessions of the conference.

Group discussions formed a valuable part of the conference and a grateful word of thanks is offered to Dale L. Bolton, Associate Professor of Educational Administration; Lee G. Copeland, Assistant Professor of Architecture and Urban Planning; Norman G. Aehle, A.I.A., Project Architect for Green River Community College; and Gerald C. Pomeroy, A.I.A., Project Architect for Edmonds Community College, for serving as group leaders.

We are indebted also to the secretaries and graduate students who assisted with the myriad of details relating to the organization and presentation of the conference.

CONTENTS

Preface . iii
Acknowledgments . v

I INTRODUCTION

Purposes of the Conference . 3
Raymond C. Schneider

II PLANNING AND PROGRAMMING

Planning and Programming: Its Theory and Future . 10
Robert H. Reed

Planning and Programming: Its Tools and Techniques . 29
Roger Malek

III DESIGNING

Case Study One

The Bellevue College Story . 48
Merle O. Landerholm
David C. Hoedemaker

Feedback Loop One . 86

Case Study Two

Toward Innovation: The Golden West College Story . 88
R. Dudley Boyce

Golden West College: An Architectural System . 95
James E. Sink

Feedback Loop Two . 111

IV IMPLEMENTATION AND EVALUATION

Do's and Don'ts in Community College Planning . 114
Lawrence F. O'Neill

Evaluating Outcomes . 123
Peter Kamnitzer

Appendix A

Conference Program . 134

Appendix B

Conference Participants . 137

I. INTRODUCTION

PURPOSES OF THE CONFERENCE

Raymond C. Schneider

The growth of the comprehensive community college has been the object of considerable national attention in recent years. It is also one of the most rapidly expanding units of higher education in the Pacific Northwest. In the State of Washington, for example, its emergence as a *bona fide* opportunity for a post-high school education and training experience has reached the end of the beginning. Following a recent in-depth study of the need for this viable institution in Washington, three things have become abundantly clear:

1. The number of such institutions will probably double in the next decade. Our neighbors are also feeling the effects of growth in their areas.
2. Key decisions affecting the future of the community college in this state have only recently been made and much activity is being undertaken across the state to adjust to the change. Each of you will, in all probability, witness unforeseen changes in your particular state.
3. Some fundamental knowledge of planning, programming, and designing new campuses is urgently needed to keep pace with the demand of change. This is of key concern to all of us.

Let me reach briefly back into history for a figure or two in order to illustrate the phenomenal growth of the community college. Between 1801 and 1920, thirty-seven public junior colleges were established in the United States.[1] These institutions are still in operation. During the single year 1965, thirty-nine new public community colleges were established. In total there were, at the end of October, 1965, 502 such institutions in the nation. In addition, there were 269 independent two-year colleges in operation on this same date. "From the time the nation's first institution of higher education opened its doors in 1636, many hundreds of colleges and universities have been built, and over 2100 still exist today. "While this is a remarkable record," according to Mayhew[2], "it is only a prologue to the future. In order to accommodate the students expected in 1975, the nation must provide *twice* the facility capacity in this decade as was built in the last three centuries."

The urgent demand for the unique two-year college will continue along these same lines. New community colleges will be established at a rate conservatively estimated to be forty to fifty a year to house this increasing population.

Thirty-four years from today, the oldest community college will be observing its bicentennial. By that time, the United States population will exceed 300 million people. The State of Washington will experience growth during this period which will attract more people to its Puget

---

[1] American Association of Junior Colleges, *1966 Junior College Directory*, Washington, D.C.: American Association of Junior Colleges, 1966.

[2] Community College Planning Center. *Planners and Planning, A Report on Community College Facilities*, Stanford, California: Community College Planning Center, 1966. p. 2.

Sound area than now reside in the entire state--over three and a half million. By comparison, the San Francisco Bay area in California, which is now holding approximately five million, will increase to nearly fifteen million--almost equivalent to the 1965 population of the entire state of California.

If we were to project the nation's need for community colleges to keep pace with the estimated population growth, it would appear that a new college may be established for each additional 100,000 people. The 837 colleges we have today will have increased to nearly 3,000 by the year 2010.

Now is the time to plan ahead. Personal experience and information from scattered reports indicate a significant number of new institutions are being planned, programmed, and designed by teams with little prior experience and with a paucity of meaningful data upon which to base their decisions.

Planning is a natural phenomenon, inherent to practically every activity we undertake. With some, minutes are critical; with others, it may involve hours, days, months, years, or longer. Whether it be a simple task or a complex one, to a degree each of us is a planner. We have been taught to plan from the earliest formative stages of our lives. In planning it becomes readily apparent that certain things must happen before other things. Some things can occur simultaneously, but each takes time, talent, and resources. There is a place to start and a place to stop. Frequently the start is predicated on an end or target. As the task to be accomplished grows in complexity, so must the planning.

Programming has become the generic term applied to the process of planning. It has risen in its level of sophistication from one which involved a long, laborious, manual process, to one which may be computer assisted. The computer, being an idiot, won't do the job any better than you can, but it can help you do it faster, enabling you to consider more alternatives in less time than previously possible. Programming a community college is an example of a complex planning problem. Building a contemporary campus to house 2,500 to 10,000 students in an urban setting, in a relatively short space of time, and with limited funds, is a common problem facing the team required to accomplish the task.

Designing is the synthesis of both from which the form, the structure, and the total environment emerge into reality. Frequently, the people involved in this process are involved for the first time (and for some it may also be the only time).

Now where, in a situation like this, can one find what to do and how to do it? Who propounds the theories from which practice emerges? What tools and techniques are best utilized? How can the newly initiated or the potentially interested acquire the necessary knowledge, skills, and abilities? And finally, are these reasonable questions? If so, who has the best answers? We believe this is for you to decide. It is toward this end that the conference was conceived and is presented.

Generally, the purpose of the conference is to bring before this select group a hand-picked team of theoreticians and practitioners whom we believe to be most capable of providing you with answers to some of these questions. Specifically, our aim is to improve the communications gap which still exists between the educator, the architect, and other members of the planning, programming, and designing team.

It is our hope that each of you will gain new insights into the creative problem-solving process. Perhaps it will provide you with a better understanding of some of the latest theoretical approaches and practical applications used by others. It may help you to solve some of the planning, programming, and designing problems with which you are confronted.

I believe that today and tomorrow we can achieve our mission. It may be possible to hold future sessions which will provide you with some assistance on related problems. If in some way we can determine your needs, then it becomes obligatory on our part to arrange additional conferences to help you meet those needs, and in stimulating ways.

We have attempted to organize the program in a logical sequence; one in which each segment evolves from the previous and leads to the next. We believe maximal benefits will accrue to each of you only if you remain for the entire conference.

It is our sincerest hope that you will gain something which will enable you to draw your planning team closer together in the *Planning, Programming, and Designing* of your community college.

II. PLANNING AND PROGRAMMING

PLANNING AND PROGRAMMING: ITS THEORY AND FUTURE

Robert H. Reed

Introduction

I will not take your time to go into the history of planning, programming, and design as is often customary on an occasion such as this. As is the case with many professions, these several facets of architecture and planning date back to antiquity. And besides, I don't remember my history very well.

And even though it is part of the title under which I have been asked to write, I do not even intend to spend much time on the theory of planning and programming. In theory, planning and particularly, programming can be described essentially as a matter of communication. Programming is the process by which one party communicates to another his needs for certain things; in our case, educational facilities. Planning is the process by which the second party communicates to the first party his recommendations as to how to acquire these needs.

Rather than dwell on history and theory, I think we should concern ourselves with the contemporary scene and the problems we face in the immediate future. We virtually have a crisis on our hands. The community college movement is faced with a sudden increase in its rate of growth unparalleled in its history. You have probably read the statistics as well as I. Something on the order of fifty new colleges are currently coming into being each year. The American Association of Junior Colleges (A.A.J.C.) has recently compiled a list of over two hundred new colleges, in some stage of early development, which plan to open for operation at various times between now and 1970.

Problems

District board officials and administrators are hard put to know where to turn for qualified people to staff these new institutions. Financing, enrollment surges, and many other problems abound. And what about facilities? At the anticipated rate of growth, five billion dollars worth of new facilities will be needed in the next ten years. This situation is spurring an unprecedented demand for the talent and teamwork required to create these badly needed facilities.

New college presidents, deans, and others who have never worked with architects and planners before may find themselves suddenly bewildered by the demands put upon them for information required in programming.

Architects who may have never designed a community college before will be called upon to create something many of them don't even understand. It behooves the educators to drive home the essence and the uniqueness of the community college to the architects. And it behooves the architects to make the educators aware of the essential elements of practice in architecture and planning.

Communication

In other words, the two professions must communicate. But communication is not always easy. Education and architecture, in many ways, present two different languages. Both parties to this situation must become, in a sense, bilingual. They should read each other's journals, visit as often as possible, and take every opportunity to exchange philosophies and experiences.

The American Institute of Architects (A.I.A.) has much to offer the educator through its services and publications. The American Association of Junior Colleges can be of direct help to the architects. As an example, I have brought with me two publications from the A.I.A. which should prove useful to any college administrator. One is entitled *Facts About Your Architect and His Work*. The other is *A.I.A. School Plant Studies*. Although this latter publication is not oriented especially to the community college, there is a wealth of good general information in its contents. And, of course, the *A.I.A. Journal*, available to any subscriber, is an excellent source of useful information for the educator.

And for the benefit of the architects who are not familiar with it, I have brought along a recent issue of the *Junior College Journal*, the best possible source of information for architects interested in doing work in this field. Another example from A.A.J.C. is a publication entitled *Many Things to Many People*, which deals with the essence and philosophy of the community college. The A.A.J.C. even has a category of membership for architects and planners through which they are entitled to receive all publications originating there, as well as an automatic subscription to the *Journal*.

One other example which I would like to bring to your attention is a *Facilities Information Bibliography* recently published by A.A.J.C.

which should prove to be useful to both architects and educators.

Of course, there is no substitute for personal contact, and conferences such as this one certainly present the best opportunity for good communication between the educator and the architect. I must take this opportunity to congratulate the University of Washington, the College of Education, the College of Architecture and Urban Planning, Professors Giles and Schneider and the many other individuals involved in bringing about this event.

Community Colleges

Back to the problem. What is this new breed called the community college which we are trying to plan, program, and design? For one thing, it is a two-year institution. But, that doesn't mean we're talking "peanuts." All across the country multi-million dollar campuses are springing up from scratch. In some instances, facilities for several thousand students are being constructed in a single phase. The last one I worked on as a campus planner before going to work for the A.A.J.C. in Washington, D.C. involved an initial investment of twenty-two million dollars to accommodate five thousand students. When one sees a project of this magnitude under construction, he realizes it rivals other such contemporary phenomena as the modern super shopping center. The community college truly *is* a phenomenon in this respect. Just compare this situation with most of the universities whose total capital investment, although often amounting to many times twenty-two million dollars, has been accumulated by bits and pieces over a period of generations.

Another significant characteristic of the community college which affects planning and programming is its inherent diversity. There is no such thing as a typical college. By definition, the community college is tailored to its own community, people, and geographic area it is intended to serve. No two colleges are the same, at least in theory they shouldn't be, if they are truly community oriented. Therefore, blueprints for one cannot be used for another.

Unbound by tradition, the community college, for the most part, has been and is becoming increasingly innovative in its educational concepts and methodology. This is one of its most outstanding characteristics.

This rapid growth, diversity, and innovative spirit of the community college movement is creating a demand for action from the design professions. But at the same time, the planning and programming processes must become increasingly sophisticated to cope with this diversity. Accordingly, we as educator-architect teams must become more sophisticated and learn to communicate with maximum efficiency.

By now, some of you may want to ask the question, "What's so difficult about communicating?" I cannot put my finger on a simple answer to such a question, but let me give you a simple example of how easily communication can break down.

During the programming phase on one of my previous jobs, which involved a university campus plan, my method of gathering information consisted of questionnaires followed by personal interviews. One of the questions included in a questionnaire sent to academic departments was, "What are your primary affinities with other departments?" To this particular question, the human relations department responded, "None," and the English department declined an answer with "Don't understand the question."

Perhaps the brevity of the questionnaire was at fault. At any rate, during subsequent interviews, the phrase "functional relationships" was substituted for "affinities" and the communications fog seemed to lift.

Other semantics problems seem to get in our way in the rush to action. What do the terms planning and programming really mean? The most publicized "programmer" at the moment is the man who communicates with the computer. To most college administrators, a "program" is a "curriculum." To many architects, a "program" is simply a "listing of spaces."

Planning

"Planning" probably has more meanings than any word I know, or don't know, as the case may be. Anyone who "thinks ahead" on any subject in any field is doing "planning." The American Institute of Planners (A.I.P.) has a definition for the word. I quote from the 1967 issue of the *A.I.P. Handbook* which states, "The planning with which the Institute is concerned has as its central focus 'the planning of . . . unified development . . . as expressed through the determination of the comprehensive arrangement of land uses and land occupancy and the regulation thereof.'" But apparently even they aren't sure, for the very next sentence in this handbook states, "An Institute Committee on Restatement of Institute Purposes is now restudying this definition."

Everyone has a master plan. Increasing numbers of the fifty states are writing master plans for education. These plans relate mostly to enabling legislation and the creation of "governing systems." More and more college districts are writing master plans for development. These particular plans are primarily related to financing, curriculum planning, and tables of organization. A master plan to some architects is likely to mean a single drawing pinned to the wall. To others it means a voluminous printed document.

Perhaps I am over-stressing a relatively minor point but the ambiguity in the use of these words does often times cloud our communications, at least temporarily. Perhaps if we simply attached a few descriptive adjectives to these terms, it would help avoid some confusion. It wouldn't be too difficult to distinguish a "curriculum program" from an "architectural program," an "educational plan" from a "facilities plan," or an "urban plan" from a "campus plan." All of which, incidentally, might be called "master plans."

I assume for the purpose of this conference we are concerned with what might be referred to in most general terms as "facilities planning" and "facilities programming." In this context, then, what do we mean by these terms?

In architectural circles there is a *de facto* distinction between "planning" and "design" although the gray area of overlap is considerable. Planning usually means the comprehensive, broad stroke, study of a project from a "high altitude" which stops short of the actual design of individual buildings. However, both the formulation of a broad stroke campus plan and the plans for an individual building require a large measure of design talent and team effort among professions. The end product of "planning" for a college campus project would be a "campus plan," a "long range campus plan," or a "campus master plan." The "campus" connotation does a pretty good job of tying this kind of planning to physical facilities as distinguished from educational or financial planning.

Architects usually look upon the total process of creating college facilities in three basic phases: site selection, campus planning, and architecture. The relative importance of these phases follows this order for each is a prerequisite to the next, and this sequence cannot be altered without suffering some ill effects.

Campus planning is usually subdivided, itself, into three phases: programming, design, and documentation. Again these phases are stated in order of importance with programming always rating an unmistakable number one.

Programming

The prelude to any good campus plan or building design is creative, effective, and thorough programming. Creative programming is certainly not a simple listing of spaces. This may be the expedient way to look upon programming, but it hardly offers a planner or designer any measure of inspiration.

In order to instill the necessary inspiration to solve problems and create individual colleges rather than build repetitive monuments, the educator-architect teams must first concern themselves with institutional goals and distinguish wants from needs. When we, especially in our moments of haste, tend to rely on past experiences, the most well-intentioned may want something he really doesn't need. Conversely, he may in the long run really need something he thinks at first he doesn't want.

The basis for sound programming, then, is to take first things first. In the beginning it is best never to talk about solutions but to focus on goals, methods, and problems. Knowing the problem is half the solution. The solution should then evolve slowly and logically from a thorough analysis of the total results of programming.

The architect must get to know his client and his client's problems in greatest detail. The client must likewise gain a thorough knowledge of his architect and the services he is capable of performing. A good college campus is more than a collection of buildings. The outdoor spaces, site development, drainage, safety, climate control, and landscape design, to name a few, are just as important to the campus plan as the buildings. The various professional talents necessary to incorporate these interrelated amenities into the plan must be represented on the design team or the project is doomed to some degree of failure. And if these necessary planning elements are not included in programming, they are apt to be overlooked during subsequent phases of the work.

Documentation

Finally, let me stress the importance of documentation. Every result of programming and planning should be systematically recorded for future reference. Accurate feedback from previous efforts is essential to progress. Any plan worthy of the title must be flexible and must soon serve as a point of departure for changing times. A lack of documentation may result in a loss of rationale behind previous concepts and derail the wheels of progress.

Educational programs change, institutional goals and methods change, technologies expand and contract or even come and go altogether. The characteristics of entire communities, therefore, may change, and the college must be prepared to roll with the punches.

The facilities must provide sufficient flexibility to accommodate these inevitable changes. And this, too, must be spelled out in programming or the educators will likely face the unpleasant alternative of bending their methods to fit their buildings.

Yes, there *is* a crisis and a demand for action. Educators are faced with quick decisions in order to start the planning wheels rolling. Architects are faced with the challenge to streamline their methods in order to work more efficiently.

But let us all remember that, beyond a point, haste makes waste. We cannot afford to sacrifice the quality which our programming and planning efforts seek to accomplish just for the sake of time. The best way to arrive early, as the National Safety Council points out, is not to drive fast but to get an early start. Education and physical facilities, as well as safety, are all long-range investments in the future of our society.

As we seek to build these unique, diverse things we call community colleges, we are faced with many problems. But along with the problems also come golden opportunities for accomplishment. Let us try our best to do the planning and programming wisely.

You know, a person with my background never feels that he has made anything approaching a decent presentation unless he somehow resorts to the use of graphics. At this time, therefore, I would like to summarize and conclude my remarks with a few charts.

People, Processes, and Time = Facilities

The creation of good college facilities requires the teamwork of numerous people, a logical series of events, and a precious commodity called time. *Chart 1* illustrates how these three ingredients can be placed in a workable planning, programming, designing, and construction sequence.

The chart is arranged with time and processes horizontally and people vertically. The process phases and sub-phases are further broken down into smaller categories of events on the horizontal dimension. The symbols with which the chart is partially filled represent a suggestion of the type of responsibility usually expected of various members of the team during the various phases of the work.

The time scale on the chart is in terms of months, and is intended to be only an approximation of the time required for an average project involving a totally new campus. It should serve, however, to illustrate the point that many months may be involved and that having a good team on the job at an early date is essential in the use of time.

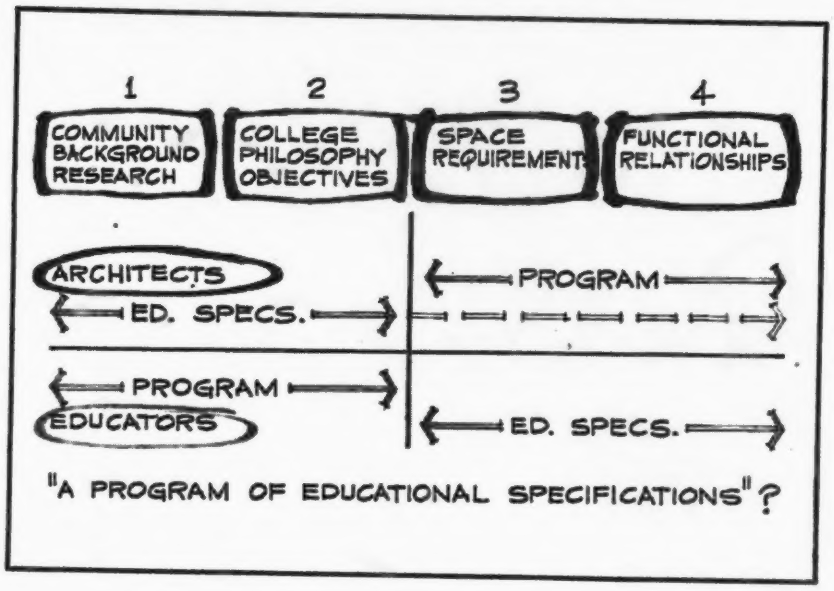
		PROCESSES ⇨	SITE SELECTION			CAMPUS PLANNING									ARCHITECTURE							
						PROGRAMING ✱			DESIGN ✱			REPORTING ✱			PROGRAMING ✱			✱ ✱ DESIGN ✱				
		TIME ⇨	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		PEOPLE ⇩	SURVEYS	EVALUATION	FINAL SELECTION	GOALS, OBJECTIVES, ASPIRATIONS, PHILOSOPHY, COMMUNITY CHARACTER	CURRICULA, TEACHING METHODS AND TECHNIQUES	EDUCATIONAL SPECS., LONG RANGE SPACE REQUIREMENTS	SCHEMATIC DESIGN	DESIGN DEVELOPMENT	LONG RANGE "MASTER PLAN"	WRITING	GRAPHICS	PRINTING AND PRESENTATIONS	REVIEW GOALS AND OBJECTIVES, ETC.	REVIEW CURRICULA, TEACHING METHODS, ETC.	DEFINE SPACE REQUIREMENTS, REVIEW BUDGET	SCHEMATIC DESIGN	DESIGN DEVELOPMENT			CONSTRUCTION
THE TOTAL TEAM	EDUCATIONAL TEAM	BOARD	○	○	*	○	○	*	*	*	*			*	○	○	*	*	*			
		CHIEF ADMINISTRATOR	○	○	▬	▬	■	■	*	*	*			*	○	○	*	*	*			
		ADMINISTRATIVE ASSISTANT	▬	■	○	○	○	○	○	○	○	○	○	○	■	■	■	○	○	○	○	○
		DEPARTMENT HEADS					○	○									○	○				
		FACULTY					○	○									○	○				
		EDUCATIONAL CONSULTANTS				■	▬	▬							○	○	○	○				
	DESIGN TEAM	CAMPUS PLANNERS	○	▬	■	○	○	■	▬	▬	▬	▬	▬	▬			○	○				
		ARCHITECTS	○	○				○	○	■	■				▬	▬	▬	▬	▬	▬	▬	▬
		ENGINEERS		○						○								○	■	■	■	■
		LANDSCAPE ARCHITECTS		○						○								○	■		■	
		INTERIOR DESIGNERS																○	■		■	
		SPECIAL CONSULTANTS	○	○					○										○			

		PROCESSES ⇨	ARCHITECTURE																			
						CONSTRUCTION																
		TIME ⇨	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		PEOPLE ⇩	DOCUMENTS			BIDDING AND CONTRACTING								CONSTRUCTION	ADMINISTRATION							
THE TOTAL TEAM	EDUCATIONAL TEAM	BOARD			*	*																*
		CHIEF ADMINISTRATOR			*	*																*
		ADMINISTRATIVE ASSISTANT	○	○	○	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
		DEPARTMENT HEADS																				
		FACULTY																				
		EDUCATIONAL CONSULTANTS																				
	DESIGN TEAM	CAMPUS PLANNERS																				
		ARCHITECTS	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
		ENGINEERS	■	■	■						■					■					■	
		LANDSCAPE ARCHITECTS	■		■																■	
		INTERIOR DESIGNERS	■		■																■	
		SPECIAL CONSULTANTS			○																○	

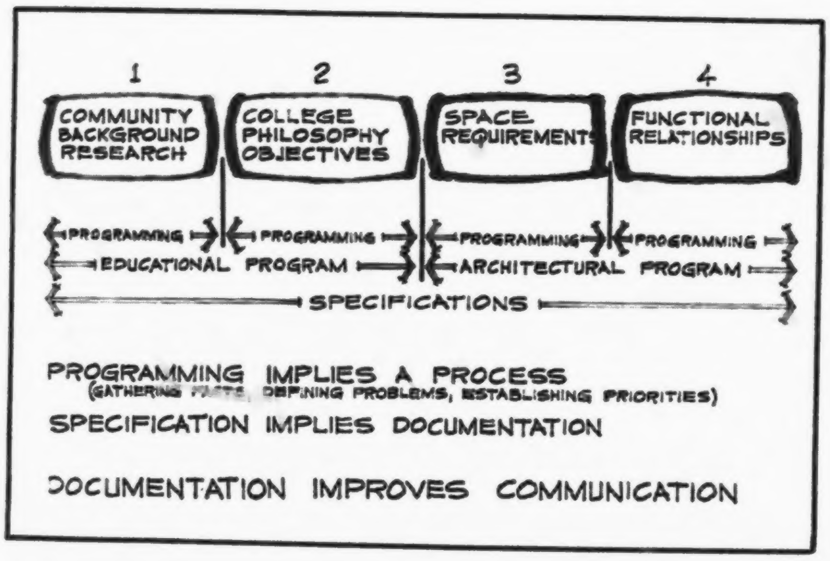
RESPONSIBILITY

▬ PRIMARY
■ JOINT
○ PARTICIPATING
* APPROVAL

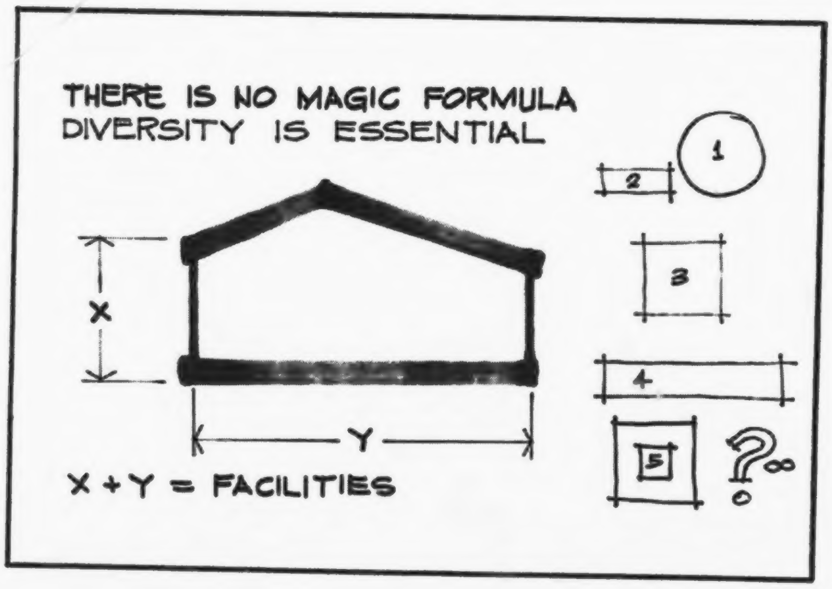
✱ COST ESTIMATES


1
2
3
4
COMMUNITY BACKGROUND RESEARCH
COLLEGE PHILOSOPHY OBJECTIVES
SPACE REQUIREMENTS
FUNCTIONAL RELATIONSHIPS
ARCHITECTS
ED. SPECS.
PROGRAM
PROGRAM
EDUCATORS
ED. SPECS.
"A PROGRAM OF EDUCATIONAL SPECIFICATIONS"?

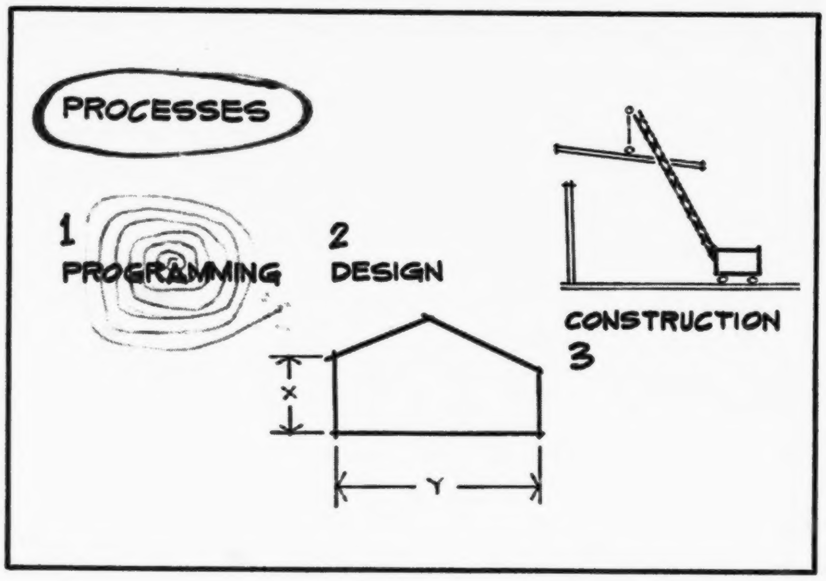
PROGRAMMING
IS
SEGMENTED


1
2
3
4
COMMUNITY BACKGROUND RESEARCH
COLLEGE PHILOSOPHY OBJECTIVES
SPACE REQUIREMENTS
FUNCTIONAL RELATIONSHIPS
PROGRAMMING
PROGRAMMING
PROGRAMMING
PROGRAMMING
EDUCATIONAL PROGRAM
ARCHITECTURAL PROGRAM
SPECIFICATIONS
PROGRAMMING IMPLIES A PROCESS
(GATHERING FACTS, DEFINING PROBLEMS, ESTABLISHING PRIORITIES)
SPECIFICATION IMPLIES DOCUMENTATION
DOCUMENTATION IMPROVES COMMUNICATION

PROGRAMMING
IMPLIES
PROCESS


THERE IS NO MAGIC FORMULA
DIVERSITY IS ESSENTIAL
X
Y
X + Y = FACILITIES
1
2
3
4
5
?∞

DIVERSITY
IS
ESSENTIAL

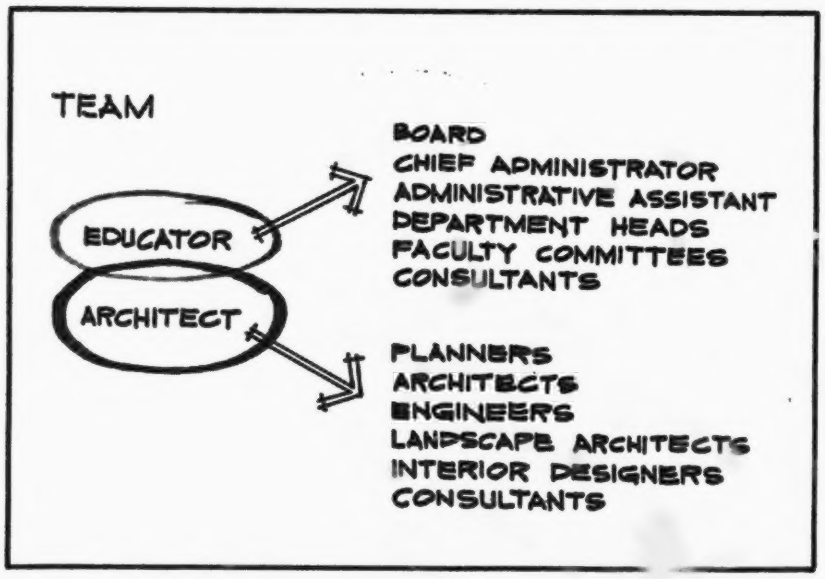

PROCESSES

1 PROGRAMMING

2 DESIGN

CONSTRUCTION 3

PROCESSES
INVOLVE
SEQUENCE


TEAM

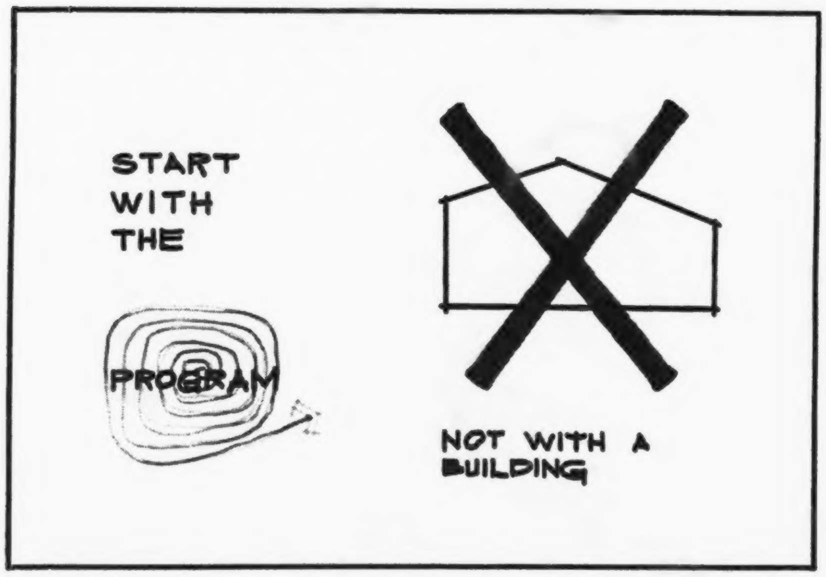
EDUCATOR

- BOARD
- CHIEF ADMINISTRATOR
- ADMINISTRATIVE ASSISTANT
- DEPARTMENT HEADS
- FACULTY COMMITTEES
- CONSULTANTS

ARCHITECT

- PLANNERS
- ARCHITECTS
- ENGINEERS
- LANDSCAPE ARCHITECTS
- INTERIOR DESIGNERS
- CONSULTANTS

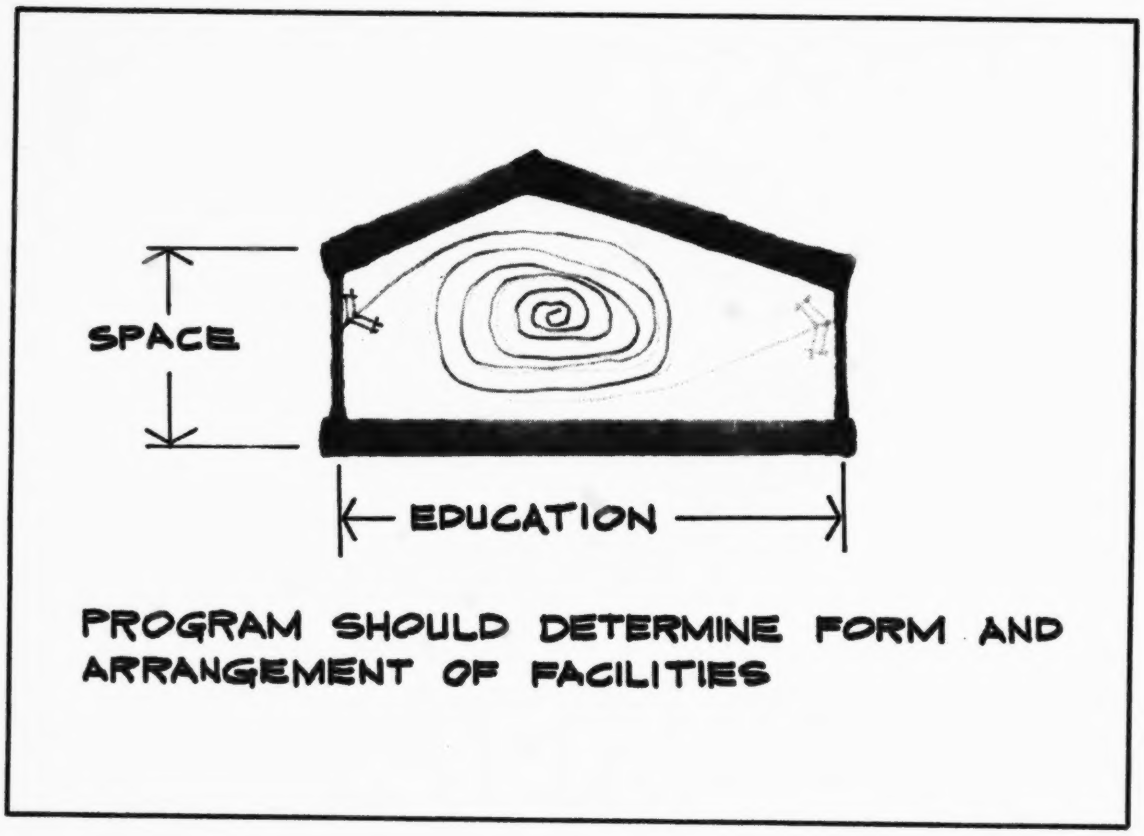
EXPERTISE AND
TEAMWORK
ARE
NEEDED


START
WITH
THE

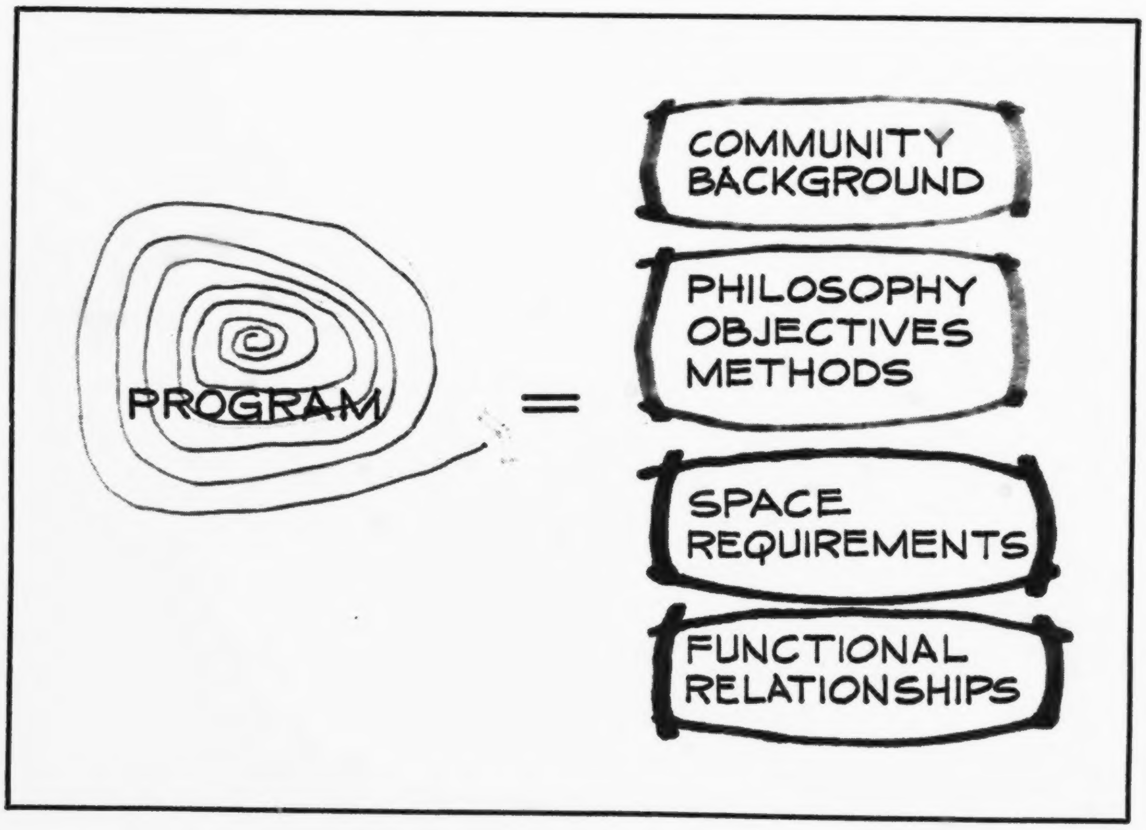
PROGRAM

NOT WITH A
BUILDING

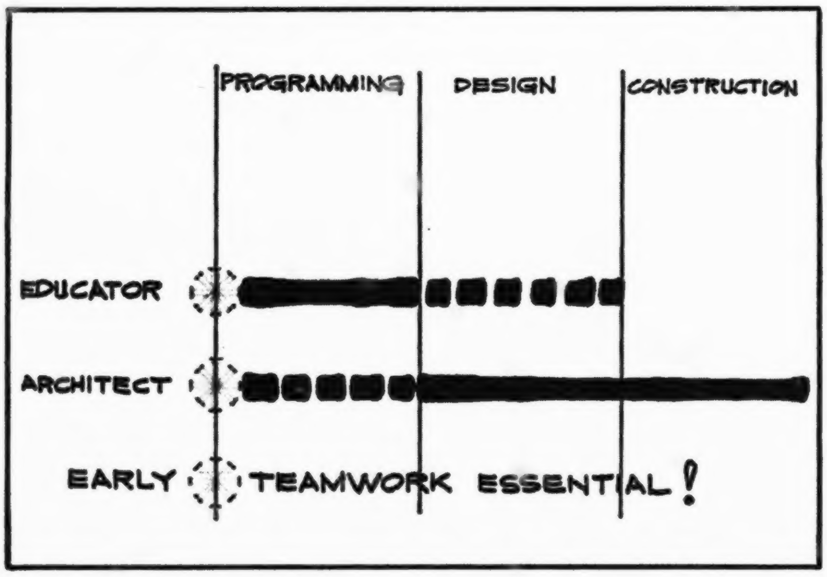
PROGRAM
IS
STARTING
POINT


SPACE
EDUCATION
PROGRAM SHOULD DETERMINE FORM AND ARRANGEMENT OF FACILITIES

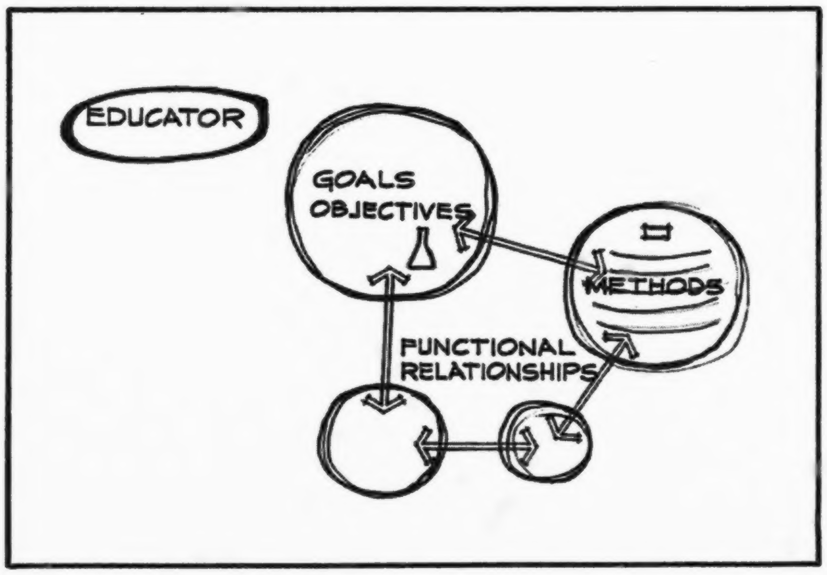
SOLUTIONS
EMERGE FROM
PROGRAM


PROGRAM
=
COMMUNITY BACKGROUND
PHILOSOPHY OBJECTIVES METHODS
SPACE REQUIREMENTS
FUNCTIONAL RELATIONSHIPS

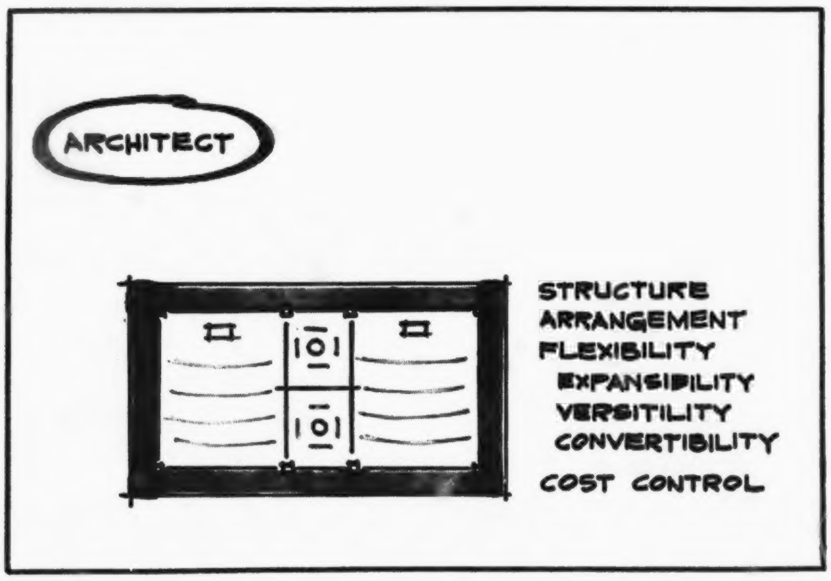
PROGRAM
HAS DEFINITE
INGREDIENTS


PROGRAMMING
DESIGN
CONSTRUCTION
EDUCATOR
ARCHITECT
EARLY TEAMWORK ESSENTIAL!

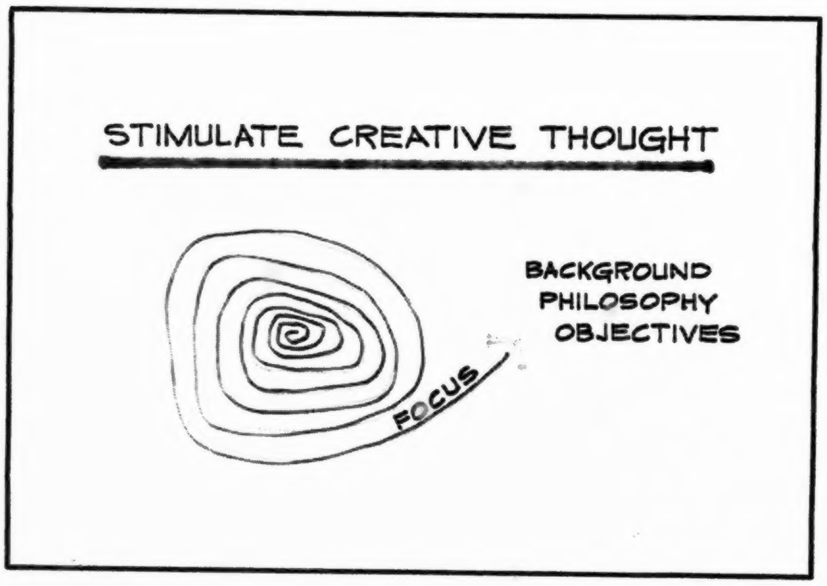
EARLY
TEAMWORK
IS
ESSENTIAL


EDUCATOR
GOALS
OBJECTIVES
METHODS
FUNCTIONAL
RELATIONSHIPS

EDUCATOR
CONCERNED WITH
PROGRAMMING


ARCHITECT
STRUCTURE
ARRANGEMENT
FLEXIBILITY
EXPANSIBILITY
VERSITILITY
CONVERTIBILITY
COST CONTROL

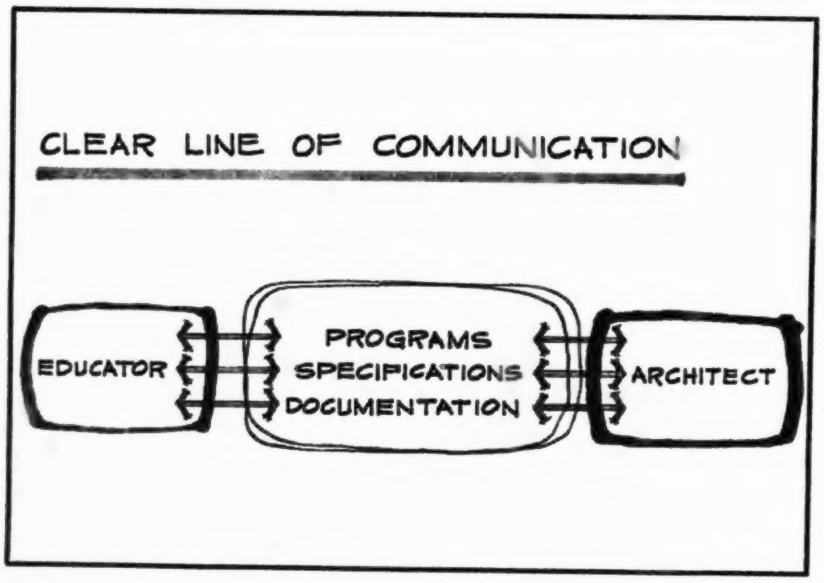
ARCHITECT
CONCERNED WITH
DESIGNING



STIMULATE CREATIVE THOUGHT

BACKGROUND
PHILOSOPHY
OBJECTIVES
FOCUS

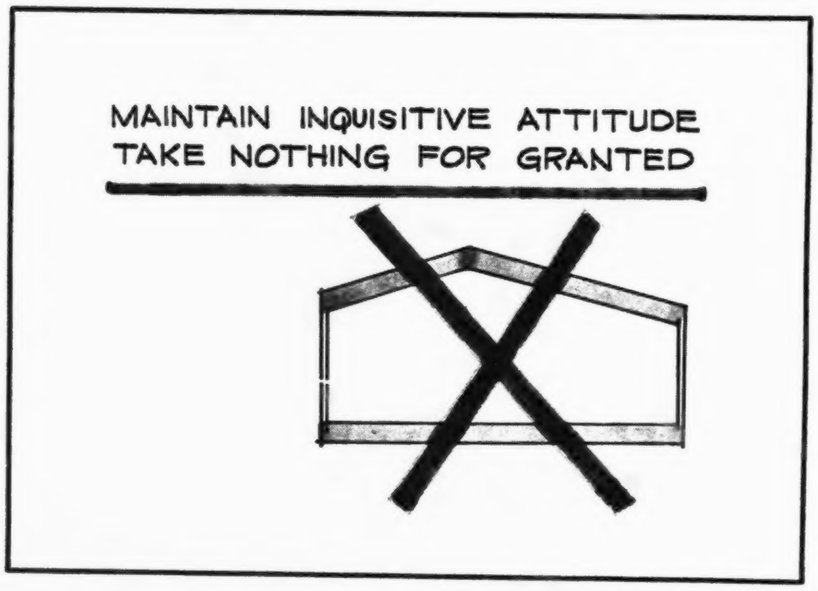
CLEAR
COMMUNICATION
IS
REQUIRED



CLEAR LINE OF COMMUNICATION

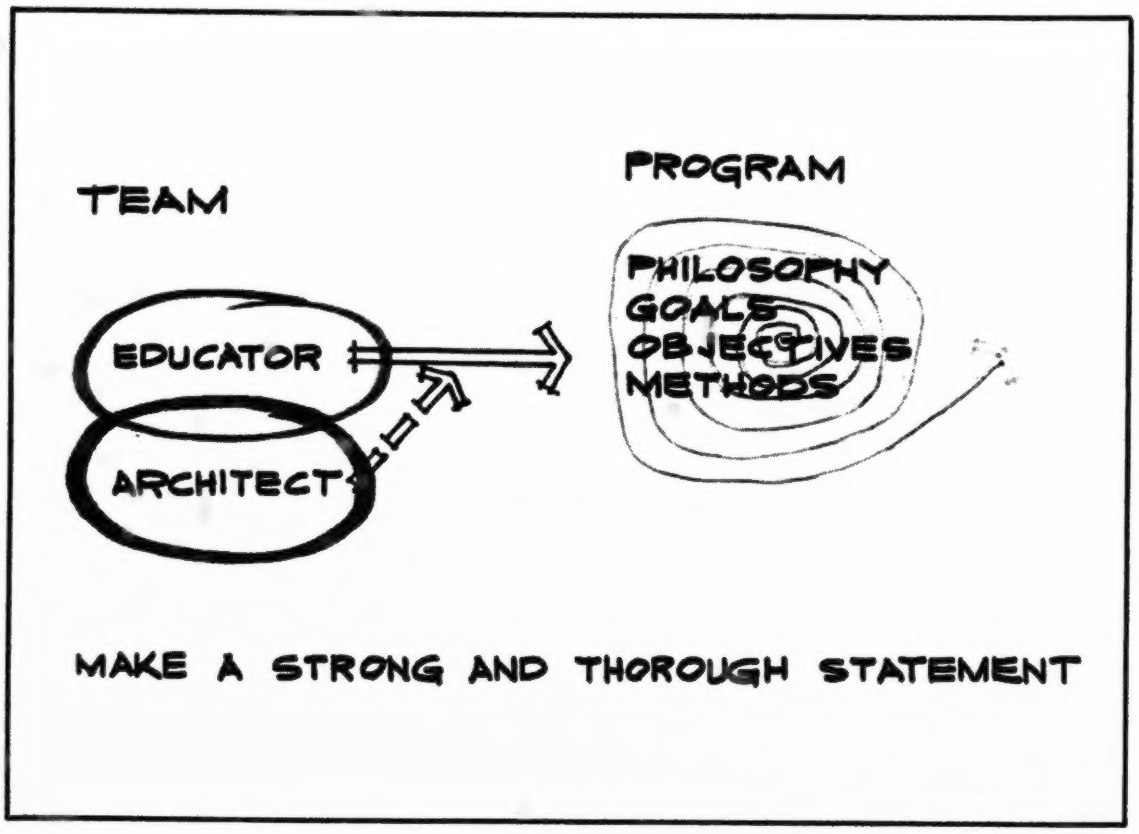
EDUCATOR
PROGRAMS
SPECIFICATIONS
DOCUMENTATION
ARCHITECT

CREATIVE
THOUGHT
IS
DESIRED

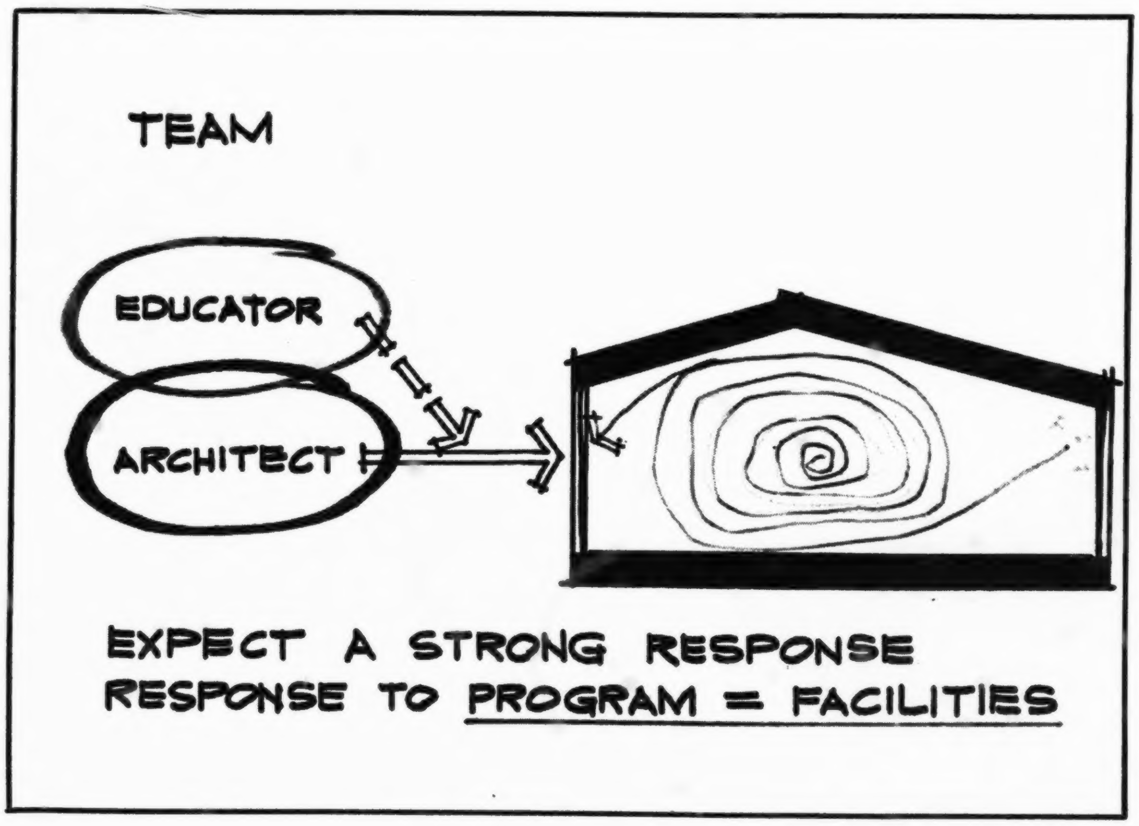


MAINTAIN INQUISITIVE ATTITUDE
TAKE NOTHING FOR GRANTED

"WHY?"
IS IMPORTANT
QUESTION


TEAM
PROGRAM
PHILOSOPHY
GOALS
OBJECTIVES
METHODS
EDUCATOR
ARCHITECT
MAKE A STRONG AND THOROUGH STATEMENT

A STRONG
STATEMENT
IMPLIES A WELL-
ORGANIZED PROGRAM


TEAM
EDUCATOR
ARCHITECT
EXPECT A STRONG RESPONSE
RESPONSE TO PROGRAM = FACILITIES

GOOD FACILITIES
REFLECT THE
PROGRAM

PLANNING AND PROGRAMMING: ITS TOOLS AND TECHNIQUES

Roger Malek

The Continuous Need for Planning

I shall take it that planning and programming for a new community college is the beginning of an interdependent planning effort which will continue for the life of the college. That the tools and techniques used to set in motion the preliminary planning and which assist in formulating the building program will become the nucleus of the future planning for that college. That the process of programming the new campus, frequently the "instant" campus, continues after the publication of the building program on through the design and initial construction, into the various stages of growth and change that the college will experience and, hopefully, with ever greater knowledge, depth, and predictability.

It used to be that a new community college was designed for a maximum enrollment, which was established either by estimates of ultimate demand or current educational theory and policy as to what the ideal campus size was. It was also a very convenient assumption for the planners, architects and all concerned. In the last few years, however, as the concept of the community college has increased in scope and depth and as the demand for its services continues to increase, as does its prestige, the ideal campus size for the college has also progressively increased, usually beyond all expectations. From 2,500 to 4,500 to 6,000, and now, community college campuses are being planned and designed for enrollments in excess of 10,000 FTE day students. However, research which would relate the effects of crowding or density on group interaction, morale, and learning has yet to be comprehensively set forth. This knowledge is necessary to finally determine the best campus size for a variety of educational goals and objectives.

As the techniques for making enrollment projections and preliminary surveys become more thorough, sophisticated, and accurate, it is important to state the building program for the various estimated stages of growth and levels of enrollment. Even though the estimated program for the later stages of development might change in detail, the procedure will promote an awareness of change and provide a preliminary measure of its impact on the planning of the college.

It is important to have a precisely stated program and that the facts be sound and the educational concepts be creative. But, it is just as important to recognize that these facts and concepts will be modified as the size of the college fluctuates, as student attitudes and needs change, and as educational theory and practice advances. The master plan does not finish the college and most certainly it will be modified. Creative educational concepts that initiate special kinds of facilities can easily become forgotten and unworkable without sufficient commitment or without systematic monitoring and evaluation of the educational goals and objectives that engendered the program.

As the college grows the faculty changes, and the original concepts will more than likely be modified, discarded, or re-emphasized. Jerome Bruner remarks in *Toward a Theory of Instruction*, . . . "a result of contemporary exploration in teaching is the conclusion that educational experiment, in the main, has been conducted and is being conducted in the dark—without feedback in usable form."

My intention is not to negate experimentation in education or the development of creative educational concepts as the very structure of the building program for the new college, but to emphasize that the successful outcome will be based on a continuing evaluation of these concepts and a framework for re-programming the changes brought about by this re-evaluation. Therefore, it is necessary that the tools and techniques used in the preliminary planning and programming be transmitted to the college and be adaptable to their continuing use.

It is important that not only the results of the demographic analysis of the community, the enrollment projections, the attitudinal surveys and depth interviews, the economic and occupational need surveys, the physical planning assumptions, the commitment to certain educational goals and objectives, and the teaching methods and techniques selected to implement them--which were used as a basis for formulating the program--be passed on to the staff and faculty of the college; they must be passed on in a coherent form.

After the first college buildings are constructed and occupied by the new students these same tools and techniques should be used by the administrative staff of the college to monitor, phase, and modify the facility needs projected for the later phases of development.

The procedures used in the initial enrollment projections will be used with an increasingly historical background and with each additional year they become more clarified, predictable, and sensitized to the local issues and parameters that affect enrollment.

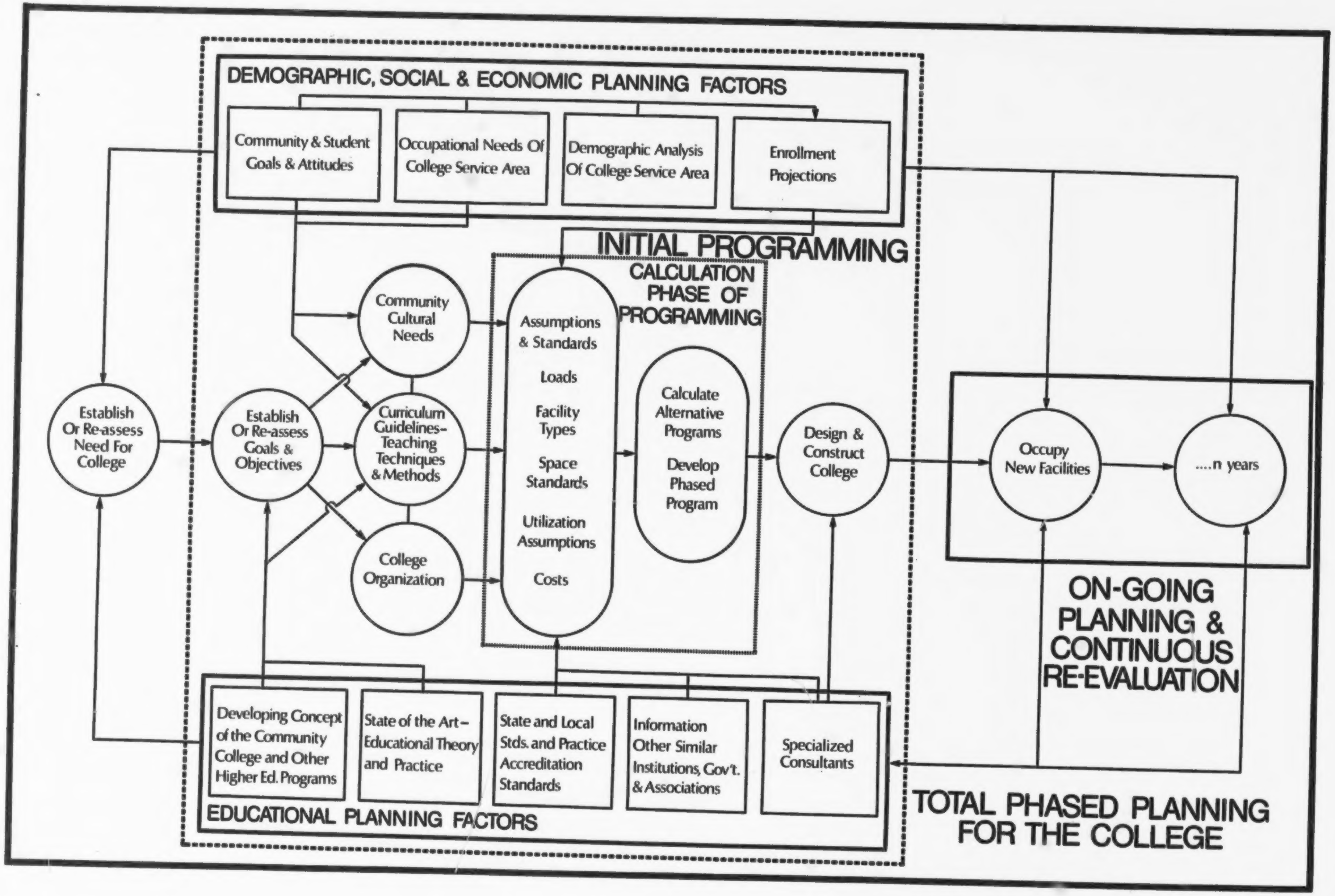
The results of the initial questionnaires, surveys, and depth interviews will be used to establish programs of communication and interaction so as to modify the initial community, parent, and student attitudes--possibly negative to the idea of a two year college--and further assess and focus student educational and occupational goals. The surveys and questionnaires will continue to be used throughout the life of the college, influencing the development of curriculum or assisting in the determination of why enrollment has been dropping, and the utilization of college facilities, by comparison with other colleges, is well below the median. All of this might well happen at a time when the college is preparing for that additional construction phase supported by the initial enrollment predictions. Hopefully, the results of the new survey will give insight into what programs are needed to reverse the cycle and what factors should be used in further enrollment projections.

While the results of the initial economic surveys are being used to formulate a continually enriched occupational and technical program, and the initial conferences with local business, industrial, and labor leaders have been translated into advisory committees--which continue to assist the faculty in developing occupational technical programs--the need for changes in special areas of the projected program for the college will certainly occur. For example, instead of an aeronautics program for the second phase of development there may be need for a large, but not completely unexpected, program in automotive technology.

Or perhaps, the conflict between the educational and occupational goals of the parents and students and the employment needs of local industry, which was discovered in the initial surveys, will have been resolved; not by a gradual program of community education and effective counseling, but fortuitously. Possibly, a newly instituted state master plan for higher education will restrict enrollments in the state colleges or the university. The enrollment estimates will need to be adjusted and revised as will the facility requirements for the projected second and third enrollment levels. Probably, the third enrollment level will be compressed into the second and considerations about whether or not to go to a single or multi-campus operation will be reopened. However, assuming that an ongoing planning framework was adopted by the college, this eventuality will be foreseen and the opportunities and limitations built into the initial program and design of the recently built campus will have been well understood, because of the use of computerized scheduling and frequent utilization studies.

Thus, as actual student attendance patterns are developed, as the curriculum guidelines are modified and re-weighted, as scheduling efficiency is increased, continuing utilization studies should be monitoring the use of the college plant. The results of these studies will modify initial utilization assumptions and, with the enrollment projections, will be an important tool in judging the lead time required for further construction phases; or maybe for deciding that they are not even necessary.

In other words, an important part of the initial building program should be the development of an organizational framework to coordinate and


DEMOGRAPHIC, SOCIAL & ECONOMIC PLANNING FACTORS
Community & Student Goals & Attitudes
Occupational Needs Of College Service Area
Demographic Analysis Of College Service Area
Enrollment Projections
INITIAL PROGRAMMING
CALCULATION PHASE OF PROGRAMMING
Establish Or Re-assess Need For College
Establish Or Re-assess Goals & Objectives
Community Cultural Needs
Curriculum Guidelines– Teaching Techniques & Methods
College Organization
Assumptions & Standards
Loads
Facility Types
Space Standards
Utilization Assumptions
Costs
Calculate Alternative Programs
Develop Phased Program
Design & Construct College
Occupy New Facilities
....n years
ON-GOING PLANNING & CONTINUOUS RE-EVALUATION
Developing Concept of the Community College and Other Higher Ed. Programs
State of the Art– Educational Theory and Practice
State and Local Stds. and Practice Accreditation Standards
Information Other Similar Institutions, Gov't. & Associations
Specialized Consultants
EDUCATIONAL PLANNING FACTORS
TOTAL PHASED PLANNING FOR THE COLLEGE

carry on a continuous process of planning and programming. The college president, the deans, the directors of institutional research, registration, admissions, and buildings and grounds all perform their separate administrative roles and develop separate bodies of concern and information.

To successfully continue the planning of the college and to be able to properly implement and modify gracefully, as need dictates, the initial program and the information upon which it is based, these separate functions must be coordinated and focused in such a way as to involve the facilities which house the college.

If the new college does this, it will not only be able to cope with its own problems more coherently and efficiently, but it will be able to transmit its experience to other colleges, thus advancing the "art" of college planning and programming.

A model of the continuous planning and programming process is depicted on the opposite page.

Record Keeping as a Planning Tool

One of the most powerful new planning and programming tools would be the design of an integrated system of record keeping which would coordinate and correlate, both qualitatively and quantitatively, the annual history of the college as it affects the planning and programming of college facilities. If these profiles were then made available on a nationwide basis to educators, planners, and architects through such informational systems as the newly formed Educational Research Information Center (ERIC), or the present Facilities Information Service (FIS) of the American Association of Junior Colleges, the planning of new campuses, especially "instant" campuses, would be considerably advanced.

Electronic Data Processing as a Planning Tool

One of the most rapidly developing and powerful tools for solving educational planning and programming problems is Electronic Data Processing (EDP). Its impact is being felt in school administration by providing such services as automation of scheduling procedures, the retrieval of educational information, simulation and modeling for educational decision making, and computer based instructional systems. These applications of EDP are generally discussed in *Data Processing for Educators* by Alvin Grossman and Robert Howe, 1965; and a monograph entitled *The Automation of School Information Systems*, edited by Donald Bushnell and published by the Audio Visual Instruction Department of the National Education Association.

The use of the computer for class assignment and utilization review was begun at Purdue University almost twelve years ago. Over the years these initial steps have been advanced and made increasingly more comprehensive by the authors of the Purdue program. This scheduling system was further developed as a Comprehensive University Scheduling System (CUSS) during a study at Seattle University. The purpose of this study was to analyze the current operational practices of the university and project its future requirements within the same frame of reference. Both programs are discussed in detail in two papers, "Purdue Academic Student Scheduling, PASS" by Victor Abell and "A Comprehensive University Scheduling System, CUSS" by Victor Abell and co-authors, both published in 1965.

In 1959, Robert Holz began work on the application of the computer to scheduling problems at Massachusetts Institute of Technology. By 1963, this program was sufficiently developed so that it could be offered to other institutions and it became known as the Generalized Academic Simulation Program, GASP. This program may be familiar to those administrators interested in junior college problems because of its use in the programming of Meramac Community College in St. Louis. A discussion of this use of computerized scheduling for purposes of programming is found in a paper by Joseph P. Cosand and John E. Tirrell, "Flying a College on a Computer."

The GASP program has been used by Arthur D. Little, Inc., in a study of coordinated course offerings and coordinated scheduling for the graduate Theological Union in Berkeley, California. The study involved the analysis of duplications in the curriculums of seven member theological seminaries and resulted in a reconstructed curriculum. The enrollments for the preceding year for all seven seminaries were then scheduled in the existing facilities of three seminaries adjacent to the University of California at Berkeley. The results were indeed surprising, for it was discovered that it is possible for seven seminaries to use the facilities of three seminaries and develop approximately 40% utilization of the facilities. Some of the other seminaries were considering, at that time, the addition of more facilities.

In 1963, the California Coordinating Council for Higher Education undertook a state-wide study of the utilization of all higher education facilities. The computer was used extensively in the sorting and statistical analysis of the data.

As early as 1956, the Committee on Enrollment Trends and Space Utilization of the American Association of Collegiate Registrars and Admissions Officers requested the preparation of a guide that would assist officials of college-level institutions to analyze the utilization of their plant space. The resulting *Manual for Studies of Space Utilization in Colleges and Universities* was published in 1957 by John Russell and James Doi.

The forms and procedures for collecting and calculating utilization data were comprehensively set forth in this manual. A similar level of detail was maintained in the California statewide utilization study. The California study gathered data on all of the parameters which affect the use of junior college facilities. Included were the calculation of credit hours, weekly student contact hours, and mean class sizes for classrooms and laboratories by curriculum category, as well as FTE teacher/weekly student contact hour ratios for each curriculum category. An analysis was made of the room period use, station occupancy, and station period use for each college and for all colleges. Data was gathered on the number and type of facilities, assignable square footages, and the distribution of instructional and support facilities. Data on existing square footages per student station were collected for each college in all categories of space use, and ranges and variations were studied.

Using much of this basic data, Dr. Barringer of the operations research group at Arthur D. Little, Inc. prepared a computer program for calculating the percentage distribution patterns of the total weekly student hours for each community college by curriculum category for classrooms and laboratories. Two comprehensive summaries of curriculum distribution were then made for the total sample of all community colleges. One summary calculated the mean percentage distribution for all colleges equally weighted. An analysis was made of the mean percentage and the variation in percentage for classrooms, laboratories and the total by curriculum category. The mean class size and the variation in class size by curriculum category for classrooms and laboratories was calculated, as well as the fraction of colleges offering that particular curriculum category. The same basic analysis was made again for the total sample, but weighted by the larger colleges.

This summary analysis was used to pinpoint consistencies and inconsistencies in the distribution of weekly student hours throughout the curriculum categories, and for comparative studies between the individual college distribution patterns and the summaries.

As additional state-wide utilization studies are periodically undertaken it will be possible to analyze historical variations and changes in curriculum distribution patterns and begin to develop a predictive tool of considerable relevance to the programming of new colleges, and a more precise projection of curriculum variations related to future enrollment levels.

I do not mean to imply, of course, that the experiences and programs of California community colleges provide all of the answers in developing comprehensive prototypes for planning and programming new community colleges in other areas. Ideally, each state should have similar programs and the data should be readily available to educators, architects, planners, and other interested parties. It is, however, a starting point. In our own work we are always interested in compiling similar data from community colleges in other states.

We have recently been involved in programming new community colleges in the midwest and have been using a technique based upon the results of these studies as data inputs for a computer program which calculates community college instructional facility requirements. In all cases, however, these data inputs are modified by a knowledge of local conditions affecting curriculum which has been gained from the surveys used in determining the demographic, social, and economic planning factors as previously described, as well as the educational planning factors as determined by local conditions and the goals and objectives stated by the board, president and whatever staff is available from the new college.

A typical description of this phase of the programming for a new college would read something like this:

1. The technique and criteria used to determine the instructional facility requirements of the college were the result of the particular conditions under which they were calculated.
2. It was necessary to produce the building program in an

extremely short period of time and prior to the completion of the normal planning process.

3. The basic decisions about curriculum had to be made without benefit of the instructional dean or faculty.
4. In order not to unduly limit later alternative choices of the future deans and faculty it was the policy of the board that a balanced variety of instructional methods and techniques were to be made available and, within reasonable limits, each member of the future faculty would be allowed to pursue the instructional method of his choice.

In the board's statement of general philosophy a commitment to a comprehensive community college offering transfer, general, occupational and continuing education curricula was made. The selection of the curriculum distribution patterns for determining facility requirements would be determined by this enunciated philosophy.

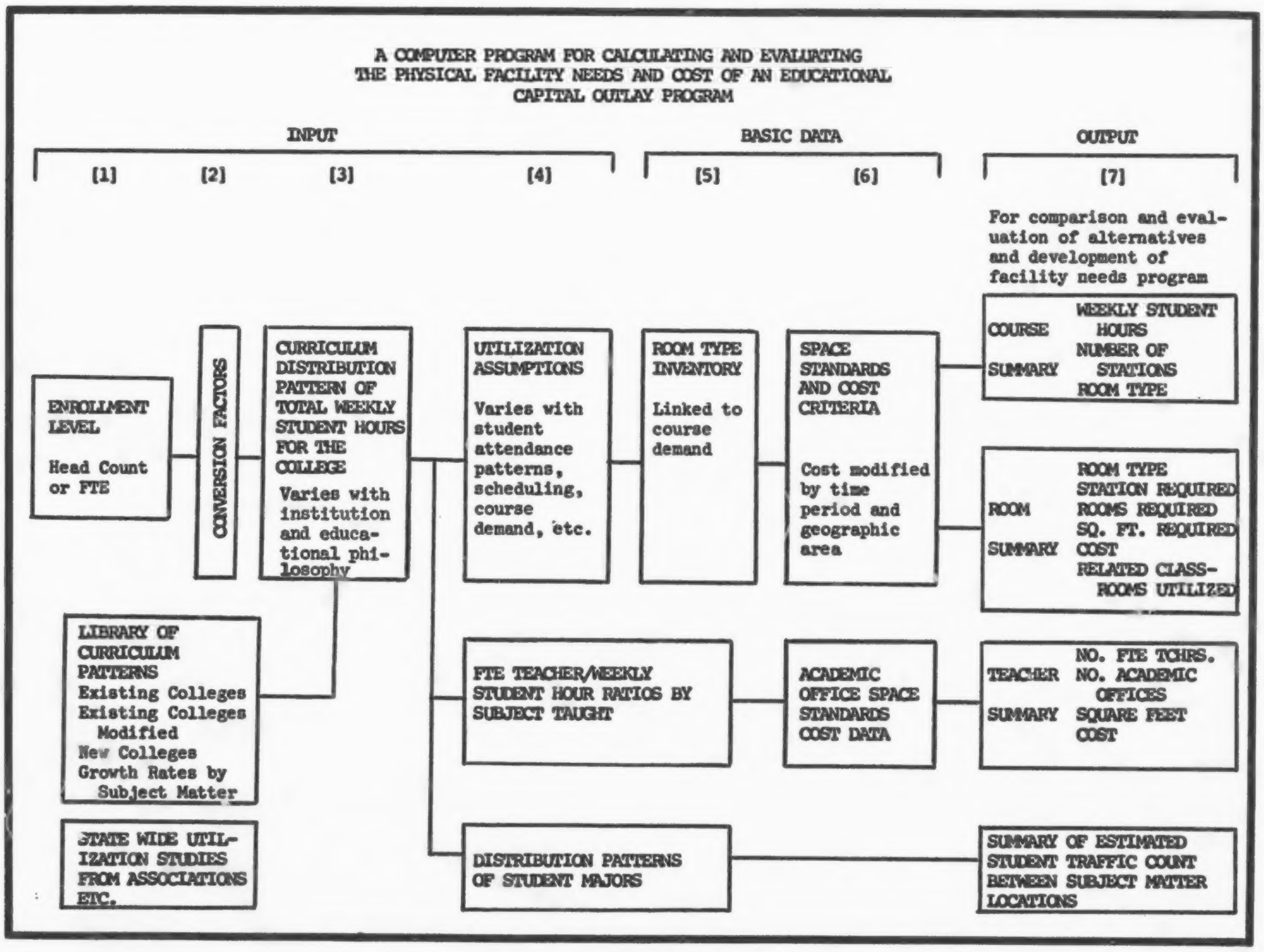
In essence, the approach which we would use divides the total weekly student contact hours for the college, at any given enrollment level, into the weekly student hours used by any given subject matter category as determined by the type of curriculum guidelines developed. The weekly student hours would be further subdivided into the demand for classroom and laboratory space as required by the subject matter. Factors determined by the utilization assumptions (the average station period use) are divided into the weekly student hours to project the number of stations demanded by subject matter and room type. The number of rooms is then determined by class size and room size standards reviewed with the board and the architects.

The curriculum patterns used in projecting the building programs would be selected from colleges in areas having comparable employment and demographic characteristics. A different pattern would be selected for each enrollment level. The later enrollment levels would develop more comprehensive vocational-technical programs. And, exogenously, because of known uncertainties in this area of curriculum development a multi-purpose laboratory for trial testing occupational programs might be programmed. As various programs become successful in these temporary facilities they would have permanent facilities built on campus in spaces reserved for them, or their equivalents, and would make room for further trial testing.

Printouts of the instructional facility requirements for maybe three or four enrollment levels would then be reviewed with the college board, president, and whatever staff is available, and modified. Because the computer program was designed for maximum flexibility in changing any of the parameters that affect the demand for physical facilities and their cost, i.e. enrollment levels, modifications of the curriculum, utilization assumptions, space standards, room types, and regional cost variations, further alternatives might be examined.

By utilizing this and similar techniques it is possible to save considerable time in the calculation of program and facility requirements and thereby produce and evaluate many more alternatives. If minimum and maximum enrollments are given for each enrollment level, two separate calculations of facility requirements can be quickly made and it can be easily determined what the impact on the facilities would be for the expected variations in enrollment. It might turn out that the minimum enrollment projected and the minimum utilization standard is best for determining facility requirements for each enrollment level. Or, most certainly for the first, so as to give sufficient elasticity in this most unpredictable phase of the college's development. Then, for that given enrollment level, the utilization will increase as the actual enrollment fluctuates from the minimum to the maximum assumption.

This technique is further described in the following flow chart and keyed text:



A COMPUTER PROGRAM FOR CALCULATING AND EVALUATING
THE PHYSICAL FACILITY NEEDS AND COST OF AN EDUCATIONAL
CAPITAL OUTLAY PROGRAM

INPUT
BASIC DATA
OUTPUT
[1]
[2]
[3]
[4]
[5]
[6]
[7]
For comparison and evaluation of alternatives and development of facility needs program
ENROLLMENT LEVEL
Head Count or FTE
CONVERSION FACTORS
CURRICULUM DISTRIBUTION PATTERN OF TOTAL WEEKLY STUDENT HOURS FOR THE COLLEGE
Varies with institution and educational philosophy
UTILIZATION ASSUMPTIONS
Varies with student attendance patterns, scheduling, course demand, etc.
ROOM TYPE INVENTORY
Linked to course demand
SPACE STANDARDS AND COST CRITERIA
Cost modified by time period and geographic area
COURSE SUMMARY
WEEKLY STUDENT HOURS
NUMBER OF STATIONS
ROOM TYPE
ROOM SUMMARY
ROOM TYPE
STATION REQUIRED
ROOMS REQUIRED
SQ. FT. REQUIRED
COST
RELATED CLASSROOMS UTILIZED
LIBRARY OF CURRICULUM PATTERNS
Existing Colleges
Existing Colleges Modified
New Colleges
Growth Rates by Subject Matter
FTE TEACHER/WEEKLY STUDENT HOUR RATIOS BY SUBJECT TAUGHT
ACADEMIC OFFICE SPACE STANDARDS COST DATA
TEACHER SUMMARY
NO. FTE TCHRS.
NO. ACADEMIC OFFICES
SQUARE FEET
COST
STATE WIDE UTILIZATION STUDIES FROM ASSOCIATIONS ETC.
DISTRIBUTION PATTERNS OF STUDENT MAJORS
SUMMARY OF ESTIMATED STUDENT TRAFFIC COUNT BETWEEN SUBJECT MATTER LOCATIONS

INPUT

1.,2. Enrollment levels can be given in the form of either head count or full-time equivalent (FTE) students. Conversion factors have been developed on the basis of a large sample which changes these enrollments to total weekly student hours (TWSH) for the institution.

3. The curriculum is developed on a subject-matter level. Room types as demanded by subject matter (both laboratory and non-laboratory) are keyed to the subject. Total enrollment is distributed to the separate subjects through a percentage distribution pattern which divides the total weekly student hours for the institution into the weekly student hours (WSH) demanded by subject matter and room type.

   The program has the capability of averaging a number of patterns. For example, one could choose five types of patterns for a given enrollment level and utilization assumptions, then average them and distribute the enrollment through the resultant new pattern. Or, if deletions are made, the pattern is normalized. Also, a different curriculum pattern can be associated with each enrollment level based on curriculums in comparably sized colleges.

4. Utilization factors can be taken to represent any level of utilization desired. The average station period use divides weekly student hours, projecting the number of stations demanded by subject matter level and room types.

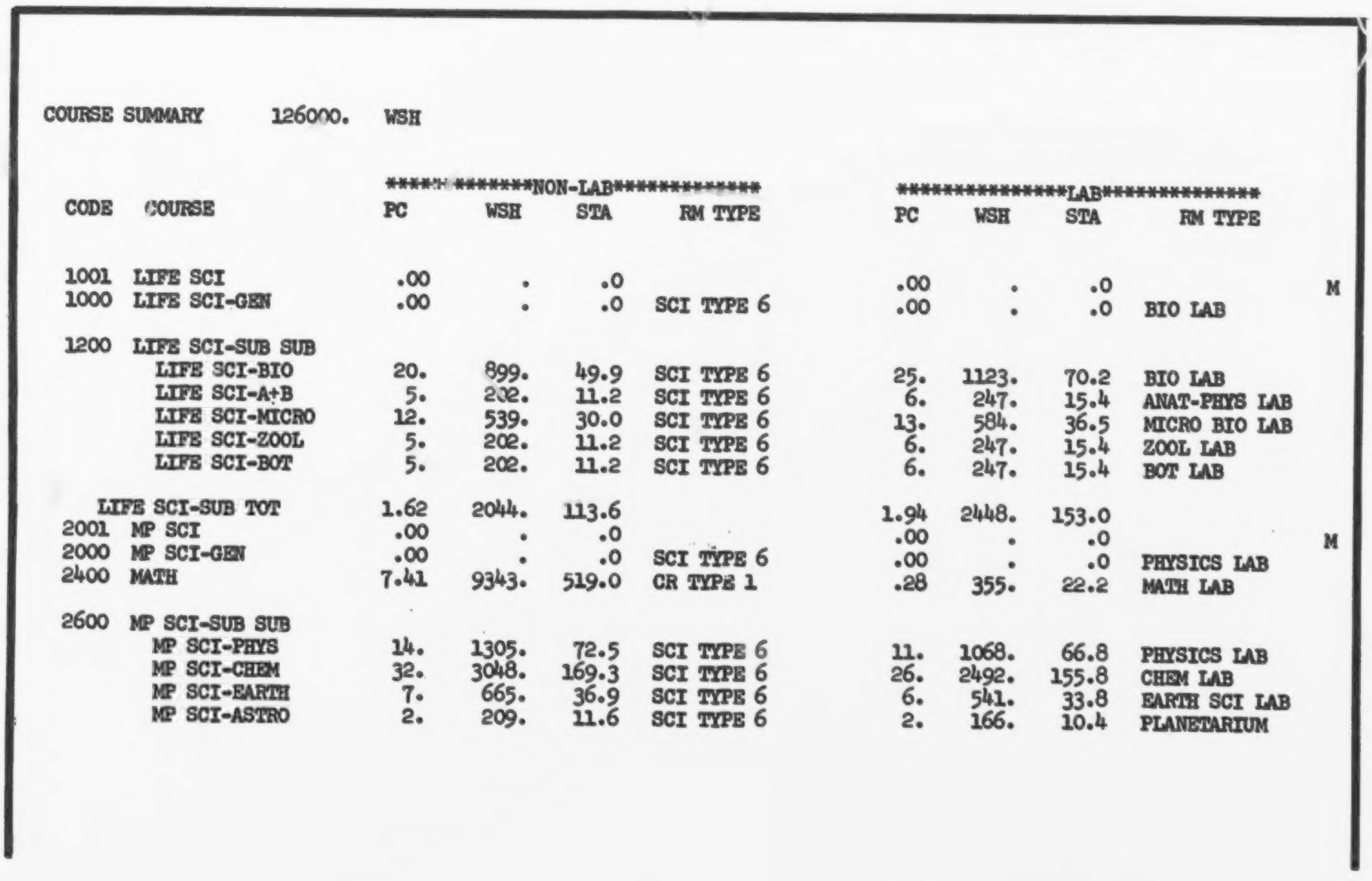
BASIC DATA

5. An inventory of any room types as used by junior colleges or as required by the teaching techniques and methods decided upon can be used, either to examine various alternatives or for the varying objectives of each college.

6. Associated with each room type are space standards (assignable square feet per station) and costs. The costs can be related to a particular time and geographic area. The space and cost standards can be modified.

OUTPUT

7. The final output from the computer is in the form of printouts as shown in the following sample:



```
COURSE SUMMARY     126000.   WSH


                              ****** *******NON-LAB*************          ****************LAB***************
 CODE   COURSE                PC        WSH      STA      RM TYPE         PC      WSH      STA       RM TYPE

 1001  LIFE SCI               .00        .        .0                     .00        .        .0                    M
 1000  LIFE SCI-GEN           .00        .        .0   SCI TYPE 6        .00        .        .0   BIO LAB

 1200  LIFE SCI-SUB SUB
          LIFE SCI-BIO        20.      899.     49.9   SCI TYPE 6        25.    1123.     70.2   BIO LAB
          LIFE SCI-A+B         5.      202.     11.2   SCI TYPE 6         6.     247.     15.4   ANAT-PHYS LAB
          LIFE SCI-MICRO      12.      539.     30.0   SCI TYPE 6        13.     584.     36.5   MICRO BIO LAB
          LIFE SCI-ZOOL        5.      202.     11.2   SCI TYPE 6         6.     247.     15.4   ZOOL LAB
          LIFE SCI-BOT         5.      202.     11.2   SCI TYPE 6         6.     247.     15.4   BOT LAB

    LIFE SCI-SUB TOT          1.62    2044.    113.6                    1.94    2448.    153.0
 2001  MP SCI                 .00        .        .0                     .00        .        .0                    M
 2000  MP SCI-GEN             .00        .        .0   SCI TYPE 6        .00        .        .0   PHYSICS LAB
 2400  MATH                   7.41    9343.    519.0   CR TYPE 1         .28     355.     22.2   MATH LAB

 2600  MP SCI-SUB SUB
          MP SCI-PHYS         14.     1305.     72.5   SCI TYPE 6        11.    1068.     66.8   PHYSICS LAB
          MP SCI-CHEM         32.     3048.    169.3   SCI TYPE 6        26.    2492.    155.8   CHEM LAB
          MP SCI-EARTH         7.      665.     36.9   SCI TYPE 6         6.     541.     33.8   EARTH SCI LAB
          MP SCI-ASTRO         2.      209.     11.6   SCI TYPE 6         2.     166.     10.4   PLANETARIUM
```

COURSE SUMMARY 126000. WSH (CONTINUED)

		*************NON-LAB*************				**************LAB**************				
CODE	COURSE	PC	WSH	STA	RM TYPE	PC	WSH	STA	RM TYPE	
	MP SCI-SUB TOT	11.56	14569.	809.4		3.67	4623.	288.9		
3001	SOC SCI	.00	.	.0		.00	.	.0		M
3000	SOC SCI-GEN	.06	80.	4.4	CR TYPE 1	.00	.	.0	PSYCH LAB	
3100	SOC SCI-ANTAR	.96	1206.	67.0	CR TYPE 1	.08	5.	.3		M
3200	SOC SCI-ECON	.97	1225.	68.0	CR TYPE 1	.00	.	.0		M
3300	SOC SCI-GEOG	.81	1018.	56.6	CR TYPE 1	.15	191.	12.0	EARTH SCI LAB	
3400	SOC SCI-HIST	4.73	5954.	330.8	CR TYPE 1	.00	.	.0		M
3500	SOC SCI-POLY SCI	2.94	3703.	205.7	CR TYPE 1	.00	.	.0		M
3600	SOC SCI-PSYCH	3.37	4246.	235.9	CR TYPE 1	.06	69.	4.3	PSYCH LAB	
3700	SOC SCI-SOCIO	1.44	1812.	100.7	CR TYPE 1	.00	.	.0	PSYCH LAB	
3900	SOC SCI-OTHER	.00	.	.0	CR TYPE 1	.00	.	.0		M
	SOC SCI-SUB TOT	15.27	19244.	1069.1		.21	266.	16.6		
4001	HUMANITIES	.00	.	.0		.00	.	.0		M
4000	HUM-GEN	.20	247.	13.7	CR TYPE 1	.00	.	.0		M
4100	HUM-ART	.70	881.	48.9	CR TYPE 1	2.76	3474.	217.2	ART LABS	
4200	HUM-DRAMA	.13	158.	8.8	CR TYPE 1	.09	112.	7.0	DRAMA LAB	
4300	HUM-ENGL	11.12	14013.	778.5	CR TYPE 1	.12	153.	9.5	READING LAB	
4400	HUM-FOR LANG	3.43	4324.	240.2	CR TYPE 1	.62	776.	48.5	LANG LAB	
4500	HUM-MUSIC	1.09	1371.	76.1	CR TYPE 1	1.36	1710.	106.9	MUSIC LABS	
4600	HUM-PHILOS	1.29	1628.	90.4	CR TYPE 1	.00	.	.0		M
4800	HUM-SPEECH	1.82	2296.	127.5	CR TYPE 1	.09	109.	6.8	SPEECH LAB	
4900	HUM-OTHER	.00	.	.0	CR TYPE 1	.00	.	.0		M
	HUM-SUB TOT	19.77	24916.	1384.2		5.03	6334.	395.8		
7100	PHYSICAL ED	1.73	2175.	120.8	PHYS ED CR	11.23	14151.	884.4	PHYS EDUC-GYM	
7500	LIBRARY	.00	.	.0	LIB CR	.00	.	.0	LIBRARY LAB	
	SUB TOT	1.73	2175.	120.8		11.23	14151.	884.4		

III. DESIGNING

Case Study One
Bellevue Community College
Bellevue, Washington

THE BELLEVUE STORY

Merle E. Landerholm
David C. Hoedemaker

The city of Bellevue, Washington, is a rapidly growing suburban Seattle community with a long-standing tradition of good education. Its growth can be illustrated by the fact that fifteen years ago there were 2,000 students enrolled in the kindergarten through twelve program. Currently, the enrollment is over 20,000 which includes a college population of 544 full-time equivalents in the college transfer program, 175 full-time equivalents in occupational programs, and a total student enrollment in continuing education of approximately 1,800.

It is estimated that the service area of the college will include a population of about 490,000 people by the year 1990. By comparison, the side community is predominantly residential in nature with a high percentage of the people employed in Seattle or Renton.

Historical Background

In 1961 the State Legislature authorized the establishment of community colleges in counties already having four-year colleges and universities. This authorization was granted to meet the pressing need for additional educational facilities in and around the state's metropolitan areas. Shortly after the 1961 legislation the Bellevue School District began preliminary studies in support of a college. Various community organizations were enlisted in the early study efforts.

In 1962 the citizens of the Bellevue School District voted a special levy to purchase a site for a community college and subsequent to that initial purchase several parcels of land have been added to the original site.

The selection of the architectural firm of Naramore, Bain, Brady & Johanson was made in 1963.

In 1964 a joint application for a community college in the area east of Lake Washington was developed by the Lake Washington School District and the Bellevue School District. To further advise the Board on items surrounding the creation of the college in the Bellevue area a Greater East Side Community College Advisory Council was begun in 1964. This council is made up of representatives of the Bellevue, Renton, Lake Washington, Issaquah, Northshore, Snoqualmie, Snoqualmie Valley, and Mercer Island School Districts.

In May of 1965 the Thirty-Ninth Legislature of the State of Washington authorized the Bellevue School District to open a community college sometime within the ensuing biennium. On May 18, 1965 the school directors of the Bellevue School District designated the position of administrative planning officer and on June 2, 1965, the State Board of Education gave final authorization to the Bellevue School District to operate a community college. The college opened its doors to students in January of 1966, seven months after it was authorized to begin.

The initial enrollment included 523 students (309 full-time equivalents). Currently, Newport High School is being used as a temporary facility until the permanent campus is ready for occupancy.

On June 15, 1965, the Board of Directors of the Bellevue School District, relying heavily upon the recommendations of the Greater East Side Community College Advisory Council, passed resolutions adopting the educational assumptions and objectives that were to form the basis for the development of the educational specifications. The Educational Specifications Committee, which included the architect, was convened in November, 1965 by Dr. Merle O. Landerholm, the Administrative Planning Officer, who was soon to become President of the college. Work on the Master Plan for the college was begun at that time.

The Master Plan

It is important that architects enter the field of community college planning with the same spirit of investigation that educators have used in developing programs for this emerging concept of education. The community college is the only educational institution created by Americans. Unlike other forms of education in this country whose histories reach far beyond the Declaration of Independence, the community college is evolving from needs occurring in the United States. Population increase and, more important, the increasing rate of urbanization of the population; rapid technical change and an increase in the number of technologies; and social change, manifested in an increased desire for higher education as well as in continuing the formal learning process beyond the age of child rearing and retirement, are primary among those factors which have led to the development of the community college. It becomes increasingly obvious to us that the common denominator in our social evolution is the element of change. It has been said that the only thing that is certain today is change, and it is to this mercurial "absolute" that we have addressed ourselves in the planning of the Bellevue Community College.

The Master Plan for Bellevue Community College is intended to serve as:

1. An illustration of how future campus facilities will implement the educational objectives of the college.
2. A basis for planning the orderly physical development of the college and its immediate surroundings.
3. A source of information to the community and other interested persons.
4. A tool for stimulating public interest in the development of the college.
5. A means of facilitating coordination between public and private bodies influencing development around the college.
6. A means of illustrating the physical impact the college will have on the surrounding areas, and the impact the surrounding

areas will have on the college.

7. A means of determining and recommending necessary action in the immediate vicinity of the college which will assure maximum public and private benefit from the college's development.
8. An estimate of future building requirements.
9. A guide to the phased implementation of the Bellevue Community College.

Master planning of the college has progressed through three consecutive phases: investigation and analysis, formulation of alternatives, and recommendations.

During the initial phase, a number of California colleges and several local community colleges were investigated. Particular attention was given to their physical form, activity placement, density, circulation, character, flexibility, and potential for future growth. Investigation of the Bellevue Community College site involved the determination of present and future conditions which will influence the development of the college. Every effort has been made to gather information from all relevant sources, including the Washington State Department of Education, the Bellevue School District, Bellevue and King County Planning and Engineering Departments, the Washington State Department of Highways, the Puget Sound Governmental Conference, and the Puget Sound Regional Transportation Study. The data consists of drawings, maps, aerial photographs, statistical information, and information derived from field surveys, personal interviews, and conferences.

Information resulting from the preceding investigation and analysis, together with the "Educational Objectives for the Bellevue Community College," the preliminary "Educational Specifications for the Bellevue Community College," and the "Planning Objectives" formulated by the architects, become a program for the design of the Master Plan.

Several alternative plans were developed for the site and immediate vicinity. These alternatives were tested and evaluated, and one plan was selected for further refinement.

The Site--Investigation and Analysis

Analysis of the Bellevue Community College site involved a consideration of the impact of the college *regionally* (the Seattle Metropolitan area), in the *vicinity* of the college (the service area), and an investigation of the immediate *site*.

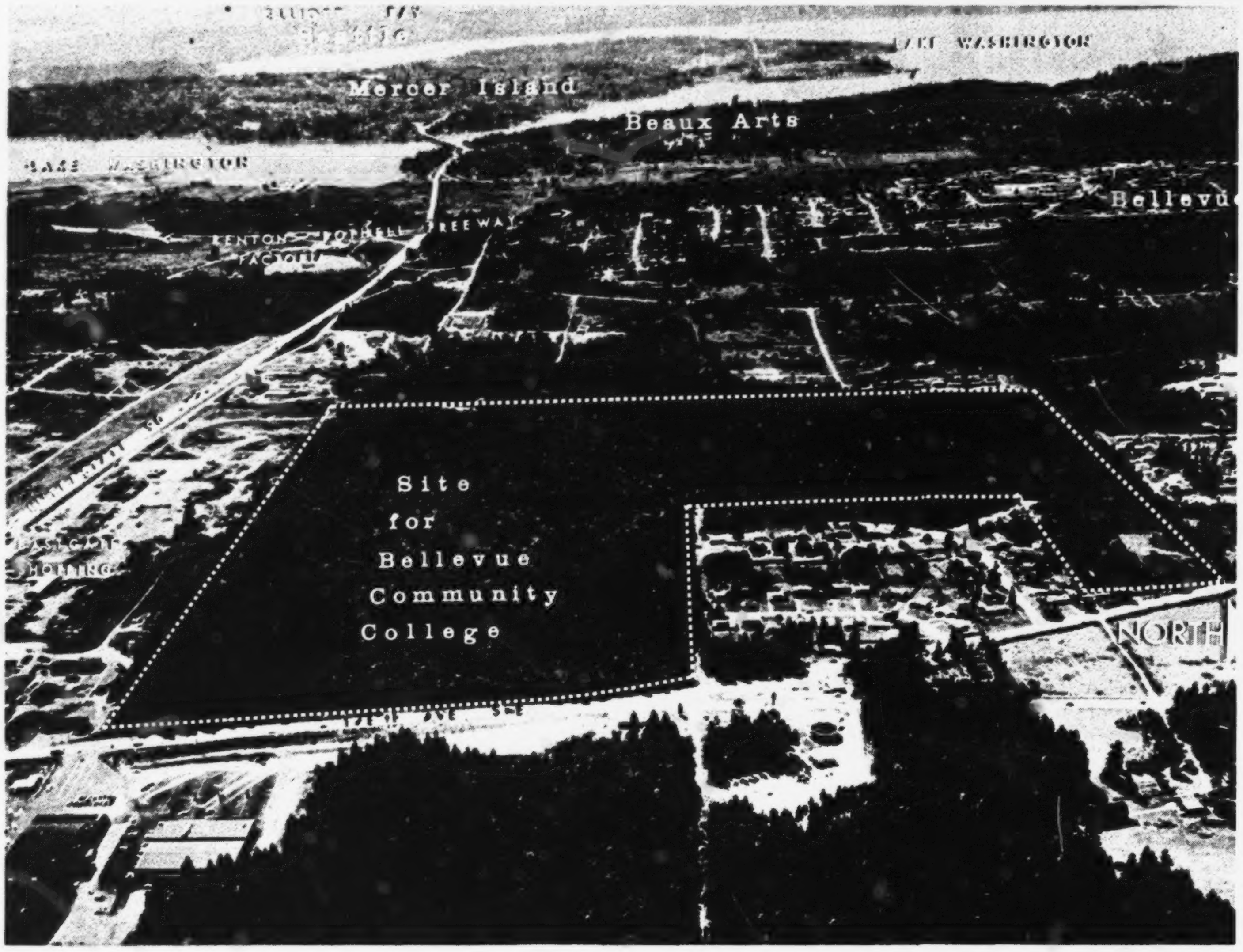
Investigation of a site's regional significance will reveal the role a college must play in the community now and in the future, not only educationally, but culturally and socially as well. Bellevue Community College is centrally located in a rapidly growing Seattle suburb, and will very likely become the cultural center of the community. This fact implies a need for a site large enough to accommodate an auditorium, a museum, or other similar facilities, and a need to consider future joint use and financing of such cultural facilities and related parking.

Vicinity was defined for the purposes of this Master Plan as the service area of the college, or that area in which students attending the college will live. The present service area of the Bellevue Community College has a population of 120,600. By 1990 the same area is expected to have a population of 495,400 with the major portion of this group in the working and child-rearing years.* The significance of this population increase to college planners is that either a ceiling must be placed upon the ultimate enrollment of the college, with additional colleges being planned nearby, or the college must be designed to accommodate a tremendous increase in its enrollment. While the legislature in the State of Washington has recognized a maximum enrollment of 2,500 full-time equivalent students, it is not practical to plan a campus that cannot easily expand beyond this figure.

While the Legislature, in its present judgment, may consider this a realistic enrollment, it may in succeeding sessions substantially increase this figure. Probably no college in the nation has maintained the enrollment it once considered to be an optimum.

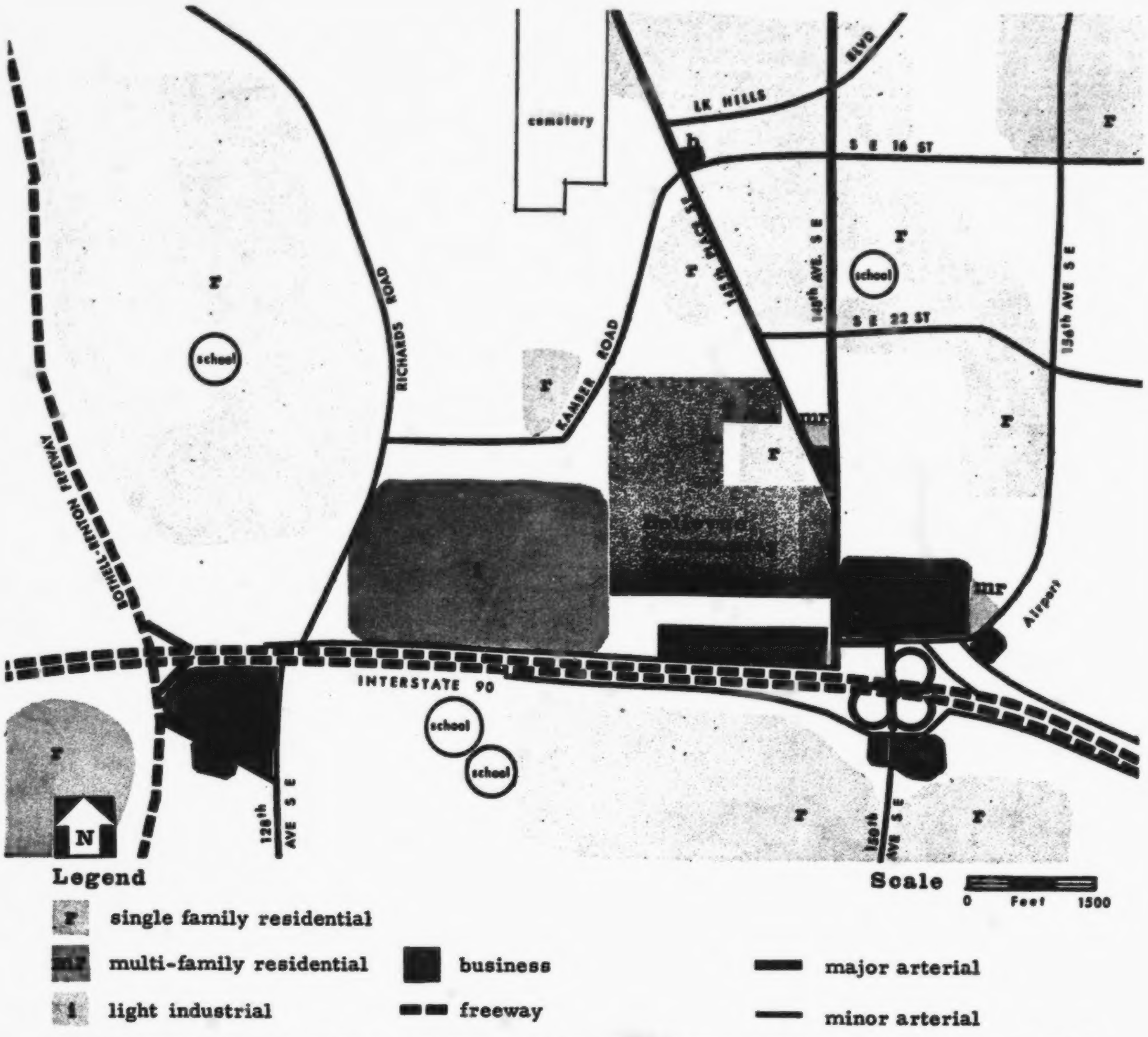
The character of a community college will be greatly influenced by the present and future land uses in the vicinity of the site, and, reciprocally, the surrounding land uses will be greatly influenced by the presence of the college. Consideration of the land use changes which may be expected as a result of the implantation of the college will serve the college planner in two ways: the need for re-zoning may be recognized and instigated early enough to insure a compatible and mutually beneficial relationship with immediately adjacent land, and present and future points of access to the site can better be determined with a prior knowledge of expected changes in the vicinity.

Puget Sound Regional Transportation Study


Mercer Island
Beaux Arts
LAKE WASHINGTON
LAKE WASHINGTON
Bellevue
FREEWAY
Site for Bellevue Community College
NORTH

Aerial view looking West

The Bellevue Community College site is presently bordered by single-family residential, business, and light industrial zonings. The light industrial area is the only one of the adjacent land uses which threatens to become a non-desirable neighbor. While the light industrial area immediately adjacent to the college is presently undeveloped, the whole of the light industrial zone is owned by a sand and gravel company with the remainder of the zone being presently used as a quarry. The college Master Plan recommends that the portion of this area adjacent to the college be re-zoned for multi-family residential use. This use would not only benefit the college, but should result in a more favorable return to the property owner.


cemetery
LK HILLS BLVD
S E 16 ST
145th PLACE S E
148th AVE. S E
156th AVE S E
S E 22 ST
school
RICHARDS ROAD
KAMBER ROAD
BOTHELL-RENTON FREEWAY
INTERSTATE 90
128th AVE S E
150th AVE S E
Airport
r
mr
N
Legend
r single family residential
mr multi-family residential
l light industrial
business
freeway
major arterial
minor arterial
Scale
0 Feet 1500

EXISTING LAND USE AND CIRCULATION 1966

The area adjacent to the college site on the south is zoned for business use, and is located between a limited access highway and the site. This area is presently an unsightly and economically unhealthy "strip" development, which, while lying between the major circulation artery and the college, presents a major planning problem. The primary access to the college must be seen to most viewers as a background to this development. It can be expected that the presence of two to five thousand students will strengthen business in this area and that new businesses serving student needs will develop. It cannot be expected that this area will become an attractive and economically well-integrated unit as a result of the college development.

It was proposed in the Master Plan for the college that the owners of the business property be encouraged to develop a comprehensive plan that would envision a new commercial "village" designed to serve both college needs and those of the surrounding residential areas. To stimulate this development the college would locate its primary entrance off a boulevard running between the college and business properties. This boulevard would be linked at each end to the primary circulation arteries and would serve the business zone as well as the college. In addition to this, the primary pedestrian circulation path of the college would be linked to that of the shopping area. This proposal was made to the business area owners by the college and is presently under consideration.

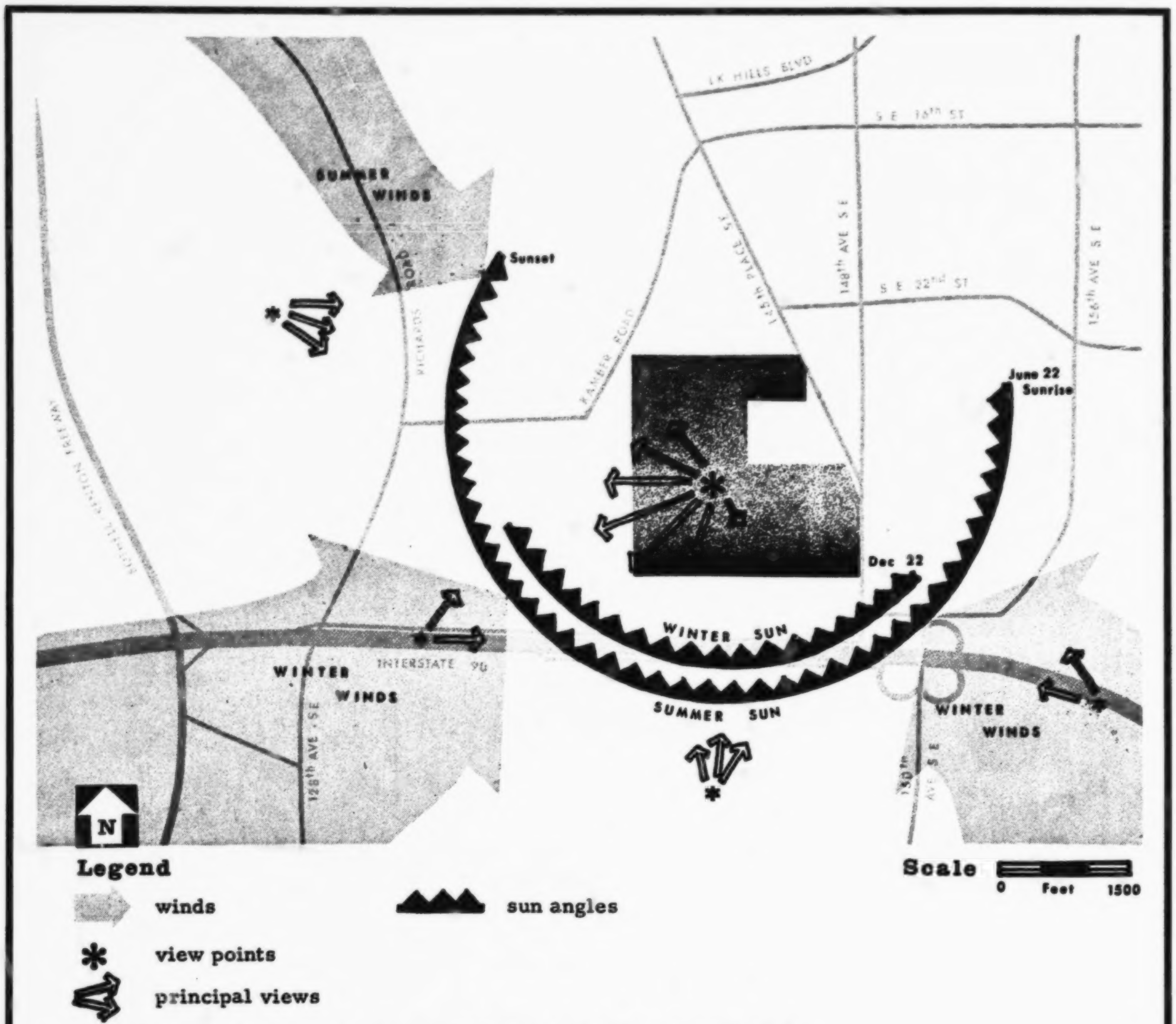
Any "vicinity" analysis for a community college must be concerned with circulation. A community college is a commuter college and with an enrollment of 4,500 full-time equivalent students, the Puget Sound Regional Transportation Study traffic analysis anticipates up to 25,000 "trips" per day. This will rank Bellevue Community College among the major traffic "generators" in the entire Metropolitan area.

An analysis of circulation in the vicinity of the Bellevue site revealed plans for a major interchange less than a mile to the west, an interchange which will border on the southeast corner of the college site, a widening of U. S. Highway 10, adjacent to the business area on the south. This latter development calls for two access ramps which will eliminate the possibility of using what had been considered the most likely major entrance to the campus. However, close cooperation with local planning and engineering officials, with the State Department of Highways, and with the Puget Sound Regional Transportation Study group brought about the modification of road planning and scheduling at state and local levels which should result in an easy incorporation of the college's future traffic patterns into the local circulatory system.

The views, wind, sun, climatic conditions, topography, landscaping, and other unique conditions of the site all affect the design of the campus. Each of these aspects was investigated to provide background information for the campus design. The final plan will provide protection from adverse conditions and will take advantage of the opportunities offered by the site.

The campus site is at the crest of a north-south ridge, rising from an elevation of one hundred feet at its west base to 430 feet at the top. To the north and east it is relatively level and to the south the ridge is broken by the highway at an elevation of 320 feet. To the west there is an agricultural valley. The site itself rises from 250 feet at the west boundary and 350 feet along the south boundary to the 430 foot crest and is covered with stands of fir, madrona, alder, and dense underbrush.

Topography is a major consideration in the location of campus


LK HILLS BLVD
S.E. 16th ST
S.E. 22nd ST
148th AVE S.E
145th PLACE S.E
156th AVE S.E
KAMBER ROAD
RICHARDS ROAD
SUMMER WINDS
Sunset
June 22 Sunrise
Dec 22
WINTER SUN
SUMMER SUN
INTERSTATE 90
WINTER WINDS
WINTER WINDS
128th AVE S.E
150th AVE S.E
FREEWAY
N
Legend
winds
sun angles
view points
principal views
Scale
0 Feet 1500

SUN, WIND, AND VIEW ORIENTATION

facilities. It influences the organization of the plan, utilities, roadways, paths, and visual aspects of the design.

A "diagram of slopes" was used as an aid to determine the suitable location for the major campus uses. Flat ground (1-3% slope) was considered best for the campus core and athletic complex, because it would require less expenditure of money for site preparation and would facilitate the

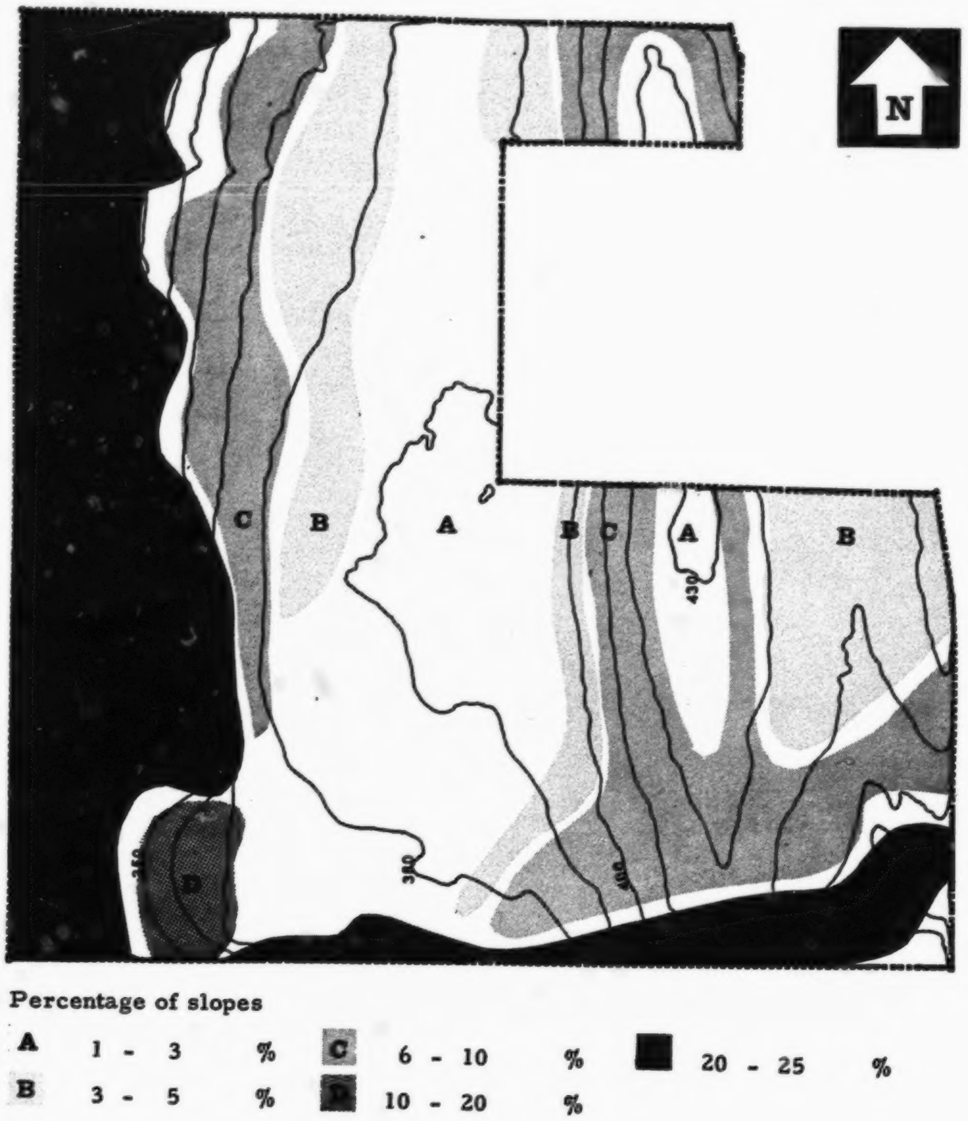

N
C
B
A
B
C
A
B
430
D
380
400
Percentage of slopes
A 1 - 3 %
B 3 - 5 %
C 6 - 10 %
D 10 - 20 %
20 - 25 %

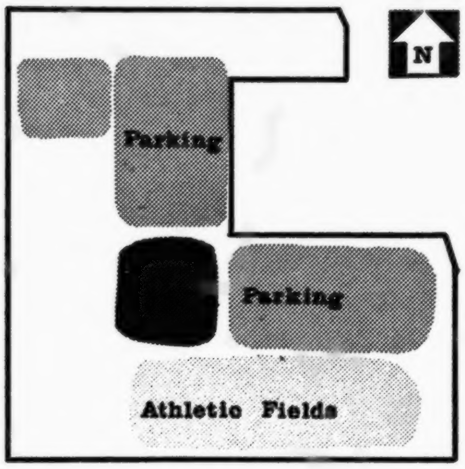
DIAGRAM OF SLOPES ON SITE BY AREA

movement of students. Roads and parking were located in areas with slopes of less than 10% whenever possible to assure ease of automobile and pedestrian circulation in summer and winter. Areas with slopes over 20% were considered unbuildable because of the extensive grading that would be required to accommodate the major campus uses. This steep area does provide excellent space for nature trails and outdoor recreation for the student and the community. It also acts as a visual separation between the college core, which will be at the top of the hill, and the surrounding development.

Master Plan Alternatives

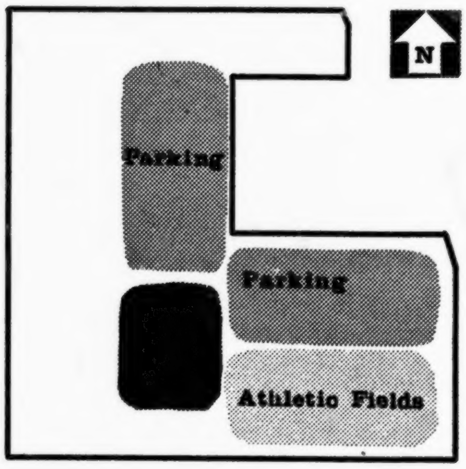
The master plan alternatives, from which the final Master Plan was developed, evolved from a dovetailing of two equally important but independent requirements: the physical demands of the site and the functional demands of the college.

Alternative land use studies and design concept diagrams were developed simultaneously. The alternative land use studies were developed to determine the optimum use of the site with regard to the site planning objectives. Six land use schemes reflecting various dispositions of the major areas of use, the academic core, athletic fields and courts, parking, and open space, were studied. Preliminary estimates of land requirements for the projected ultimate campus enrollment of 4,500 full-time equivalent students indicated that of the approximately ninety-five acre campus the academic core would occupy ten acres, fields and courts twenty-four acres, parking thirty-five acres, roads ten acres, and preserved natural areas sixteen acres.

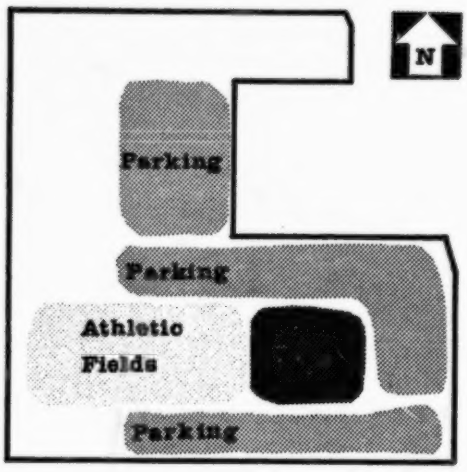


SCHEME 1

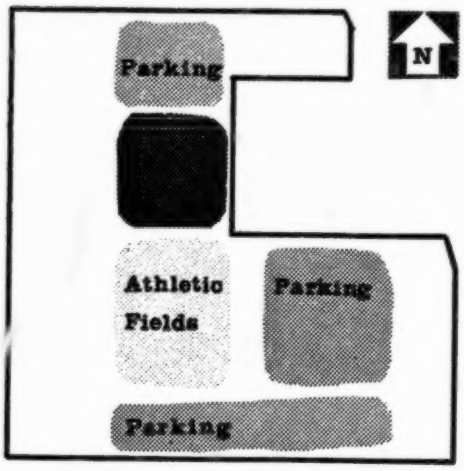
SCHEME 2

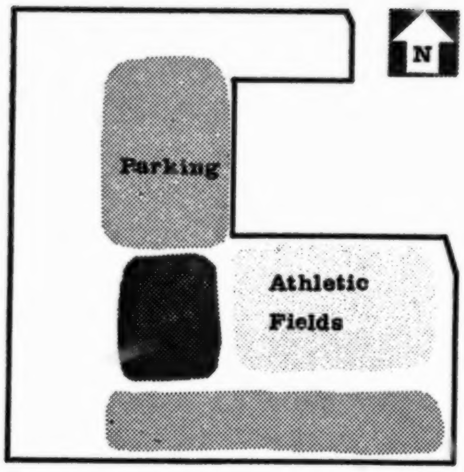


SCHEME 3


N
Parking
Parking
Athletic
Fields
Parking

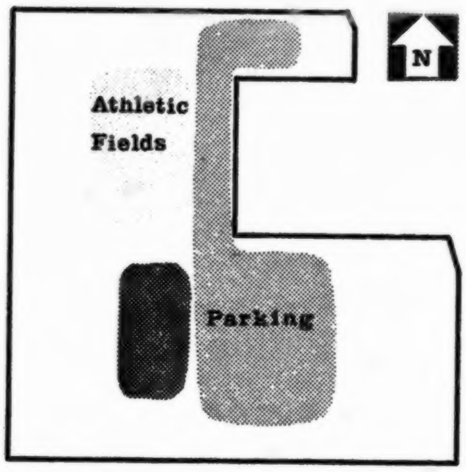
SCHEME 4


N
Parking
Athletic
Fields
Parking
Parking


N
Parking
Athletic
Fields

SCHEME 5

SCHEME 6


N
Athletic
Fields
Parking

The land use study selected for further development *(Scheme 6)* located the academic core in the area of the site allowing the greatest potential for expansion, both laterally and linearly. The athletic fields are located on a flat area at the same elevation as the academic core and in a location visually secondary to the core. Parking parallels the core and athletic area serving both students and spectators from one side of the campus, while the steep bank of the west side of the campus is preserved for use as a "buffer" and as a field study area for the natural sciences.

With the element of change a matter of primary concern in the development of a community college, a series of "design concept diagrams" were made to study various patterns of growth. Of particular concern in evaluating these diagrams were the capacity for expansion to accommodate new facilities, expansion of existing facilities, the opportunities for interaction (communication) inherent in them, and the physical appearance and character of the campus implied by the diagrams.

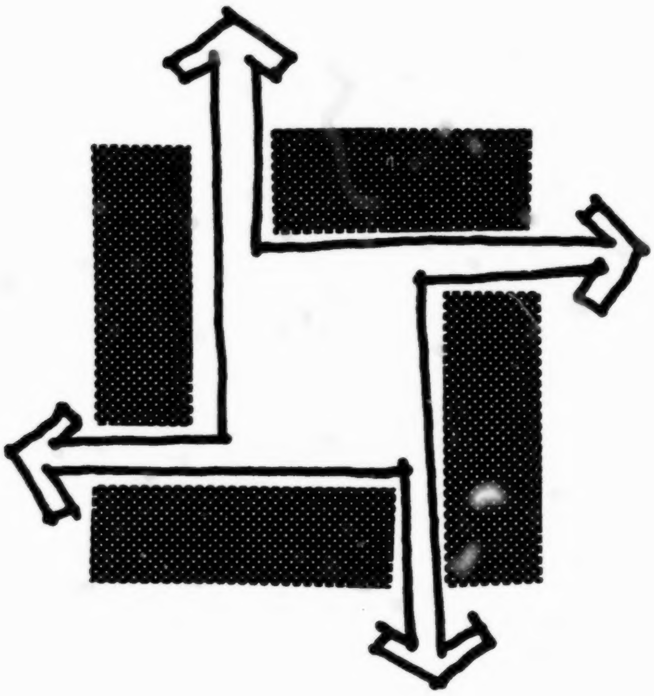


FIGURE 1

If one imagines the shaded areas in *Figure 1* to be buildings and the arrows to be paths of pedestrian circulation, it can be seen that an enclosed space is provided in the center which is at the same time a crossroads of circulation. Expansion of this scheme would be made through the addition of buildings along the paths of circulation outside the existing building areas. This diagram became the basis for one of the Master Plan Alternatives.

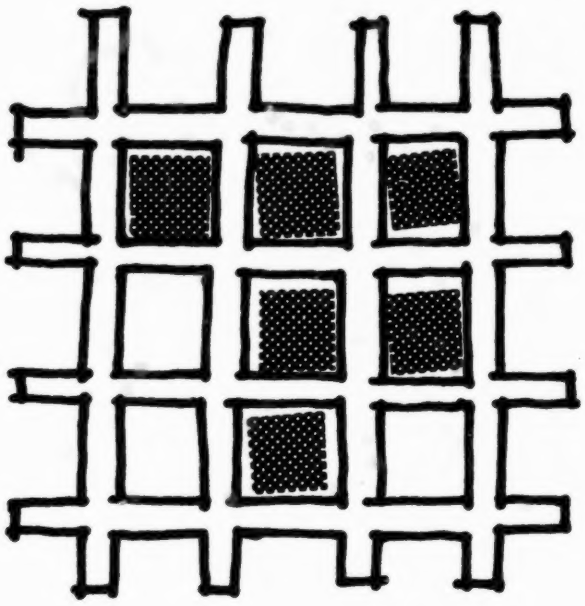


FIGURE 2

A grid system, such as the one illustrated in *Figure 2*, makes peripheral expansion relatively easy. With the shaded area representing buildings, however, it can be seen that additions to existing facilities would not be possible other than vertically. This system of development would not provide any common area of pedestrian interchange.

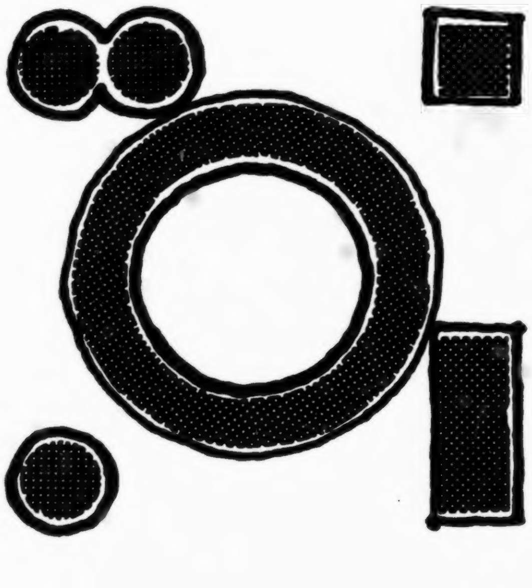


FIGURE 3

A closed scheme of the type illustrated in *Figure 3*, whether circular, square, or rectangular, is limited in its capacity to absorb new facilities. When the circle is closed by additional building its growth is restricted to perimeter additions or a new nucleus which would weaken the unity of the campus.

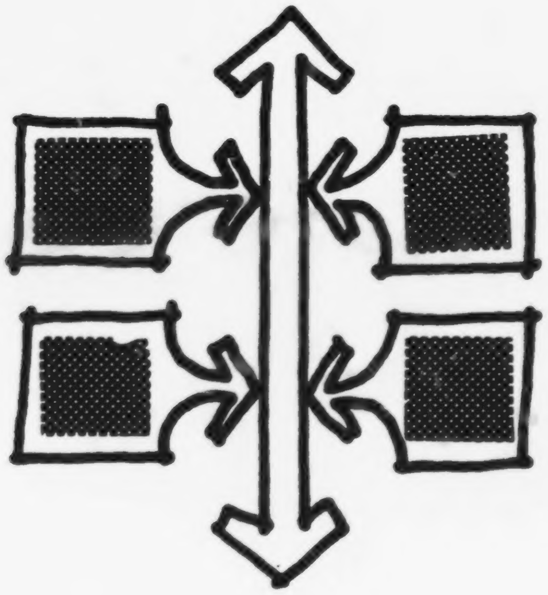


FIGURE 4

Figure 4 is commonly referred to as a spine scheme. The central pedestrian circulation space grows linearly as required for the addition of new facilities, which are connected to it by walkways. The pedestrian spine would connect with a bus stop, the gymnasium facilities, a shopping area, or some other pedestrian terminus. This scheme was investigated further as a master plan alternative.

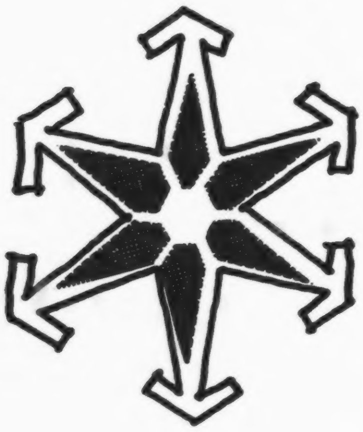


FIGURE 5

As the shaded building area grows in *Figure 5* a series of courts could be created between the building fingers and there might be a common central space in the center through which all pedestrian circulation would pass. Additions to this scheme would be difficult near the center due to lack of space, and its shape lends itself best to a flat site.

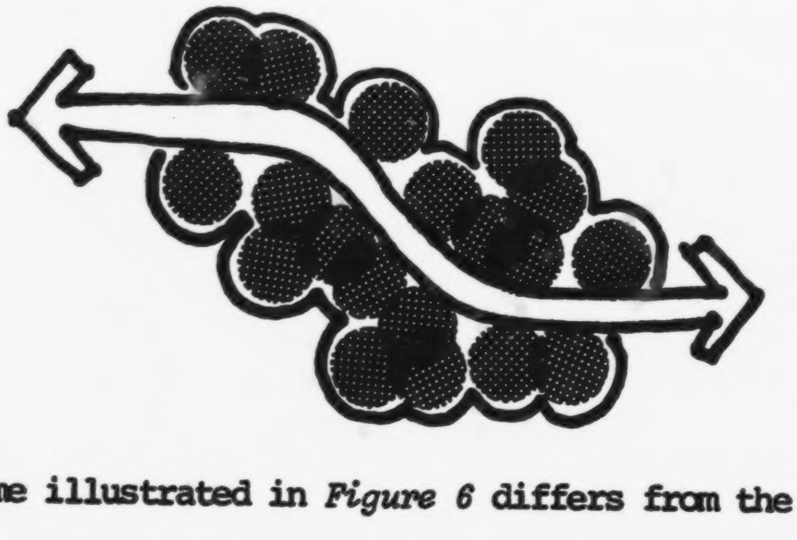


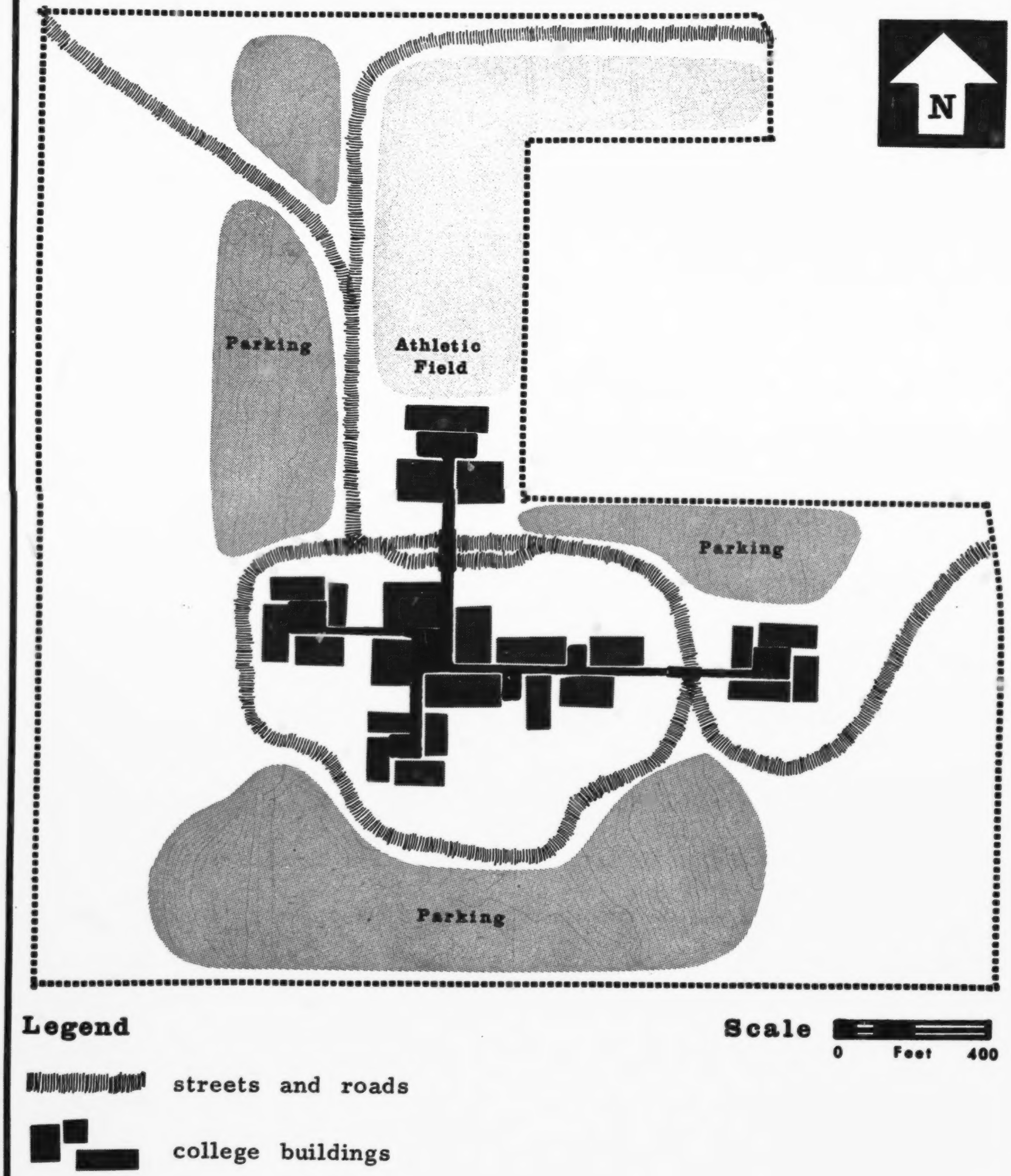
FIGURE 6

The scheme illustrated in *Figure 6* differs from the spine scheme in that the pedestrian spine follows the contours of the site and is formed by the buildings along it. Additions to the campus would be in the form of incremental units added where and as required. This scheme has a capacity for linear growth limited only by the site, and was selected for further investigation as a master plan alternative.

The four campus master plan alternatives, one of which became the Master Plan for the college, evolved directly from the preceding studies. *Alternative One* is representative of several of its type that were evaluated and is directly related to the design concept diagram illustrated in *Figure 1*.

This alternative has the advantage of creating a definite campus center through which students and faculty would pass if their classes were so scheduled as to require them to move from one end of the campus to another. Additions to this campus could be made either by a single building or by an entire cluster of buildings, with new courtyards being created in the process. The campus buildings, athletic fields, and gymnasium complex are well related to the topography. However, there are several disadvantages to this scheme. Expansion of the central core buildings is limited unless the additional clusters are sufficiently distant from them. The effect of this characteristic would be a loosely knit campus with considerable space between buildings. Inherent in this scheme also is the possibility of developing a cluster which is primarily academically oriented on one side of the center and a cluster oriented to vocational-technical studies on the other; a condition which is contrary to the initial planning assumptions. The location of parking is good in its relationship to the campus, but the south parking area is between the campus and the area from which the campus will be most often viewed.

The difficulties involved in making additions to existing facilities and the danger of encouraging the separation of disciplines resulted in the rejection of this alternative.


N
Parking
Athletic Field
Parking
Parking
Legend
Scale
0 Feet 400
streets and roads
college buildings

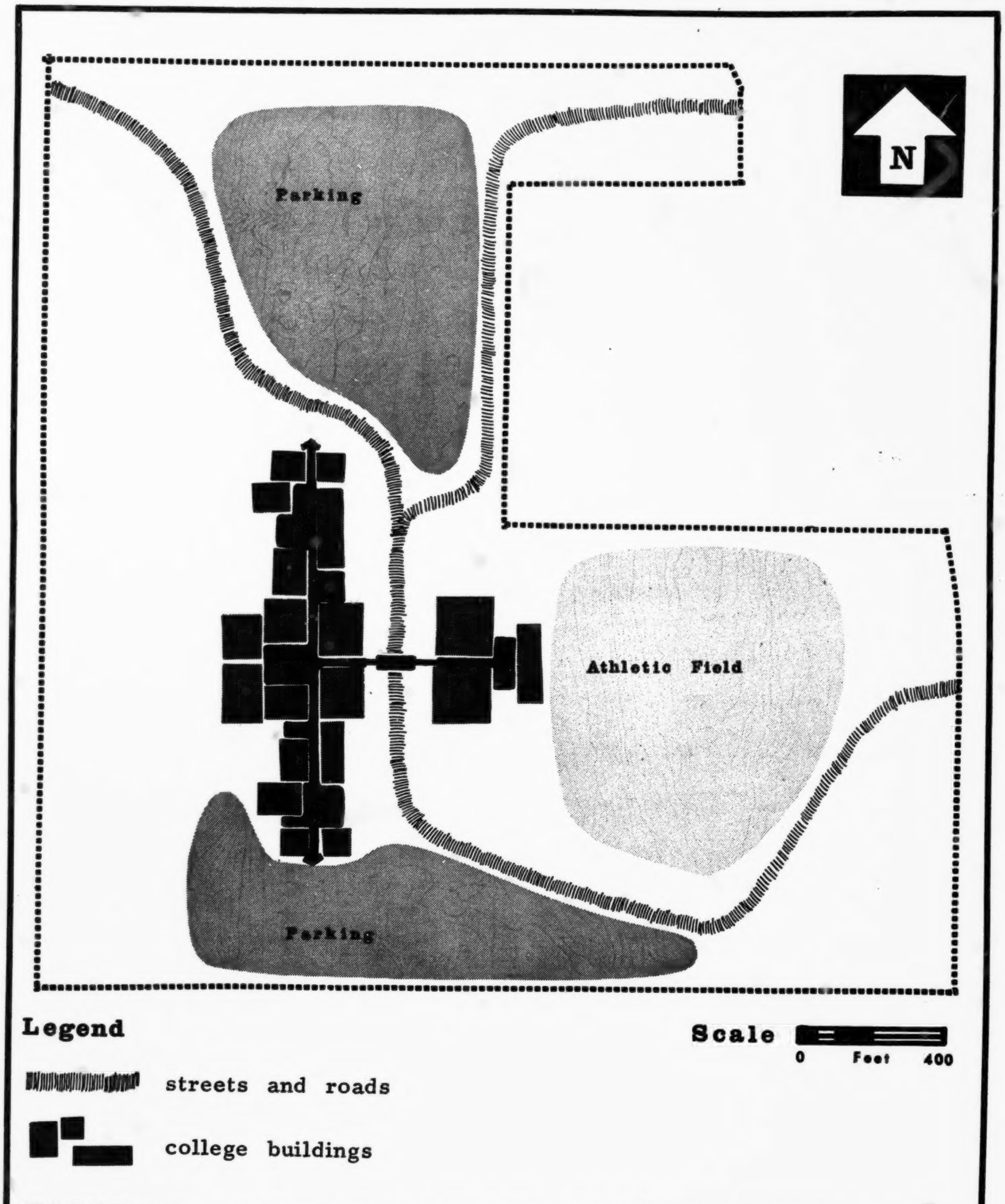
CAMPUS MASTER PLAN ALTERNATIVE 1

Alternative Two is a "spine" scheme. Primary pedestrian circulation is north-south between the buildings with the main college entrance located between the center of the campus and the athletic complex. Linear expansion of this scheme is limited only by the boundaries of the site, and horizontal expansion is limited only by the proximity of the road to the east and the steep slope to the west. Parking is located so that students flow through the pedestrian spine to the center of the campus. Location of the gymnasium complex is undesirable in that any major entrance road to the college from the south or east must come from behind the gymnasium. The athletic fields are poorly located in this study with regard to the topography.

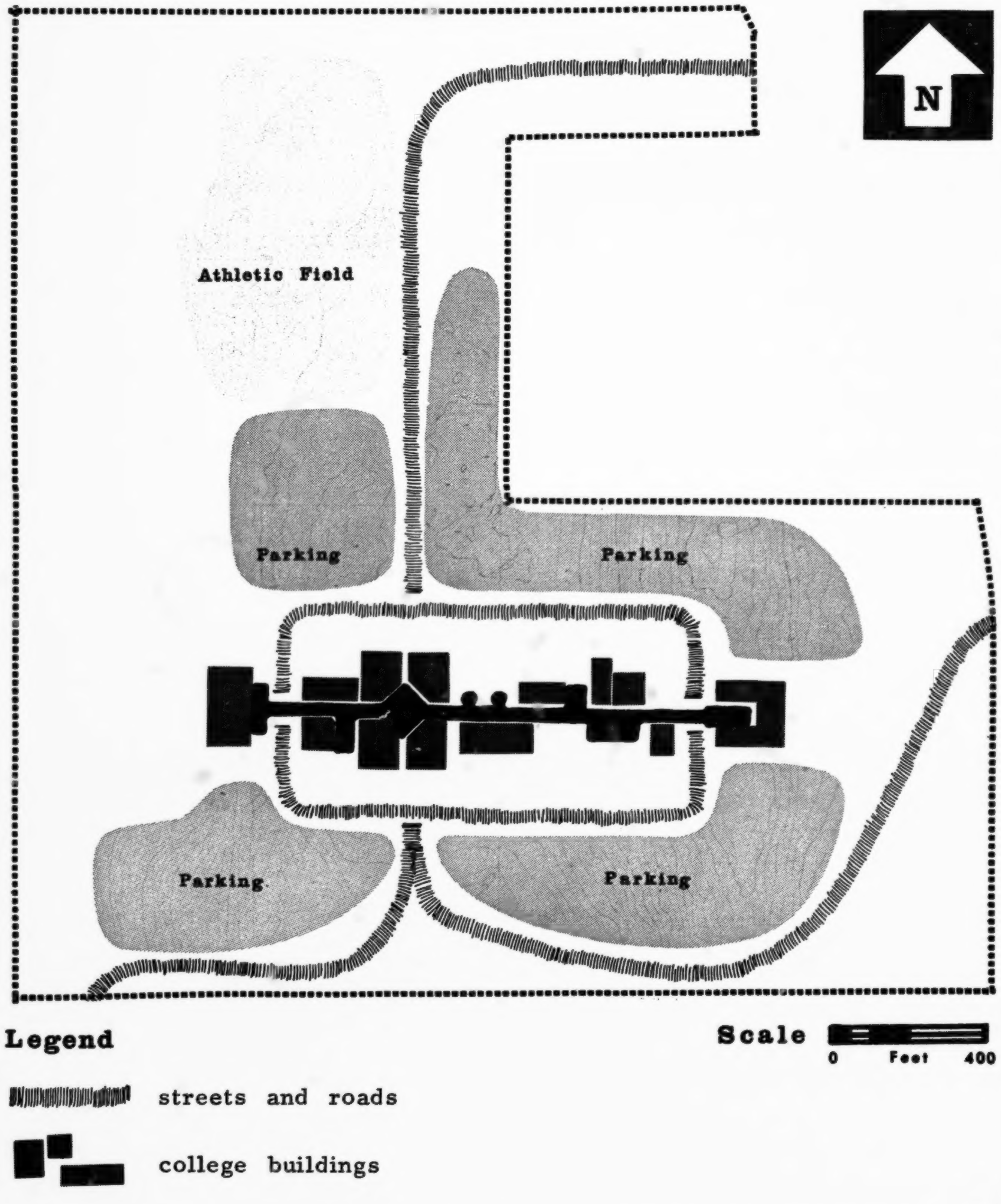
While the expansion potential of this alternative is good, the location of the athletic complex is unacceptable.

Alternative Three differs from *Alternative Two* in that the pedestrian circulation spine is terminated initially by major building elements which become physical goals towards which the campus progresses in its development, as well as in its east-west rather than north-south orientation.

Expansion of this scheme is good east and west up to the terminal buildings and good laterally for the incremental additions that will be necessary to the existing facilities. The relationship of parking to the college is good in that walking distances are minimized to any point in the complex. Nevertheless, there are several limitations to this scheme. The topography is such that the eastern end of the campus becomes excessively steep. The relationship between the athletic area and the


N
Parking
Athletic Field
Parking
Legend
Scale
0 Feet 400
streets and roads
college buildings

CAMPUS MASTER PLAN ALTERNATIVE 2


N
Athletic Field
Parking
Parking
Parking
Parking
Legend
Scale
0 Feet 400
streets and roads
college buildings

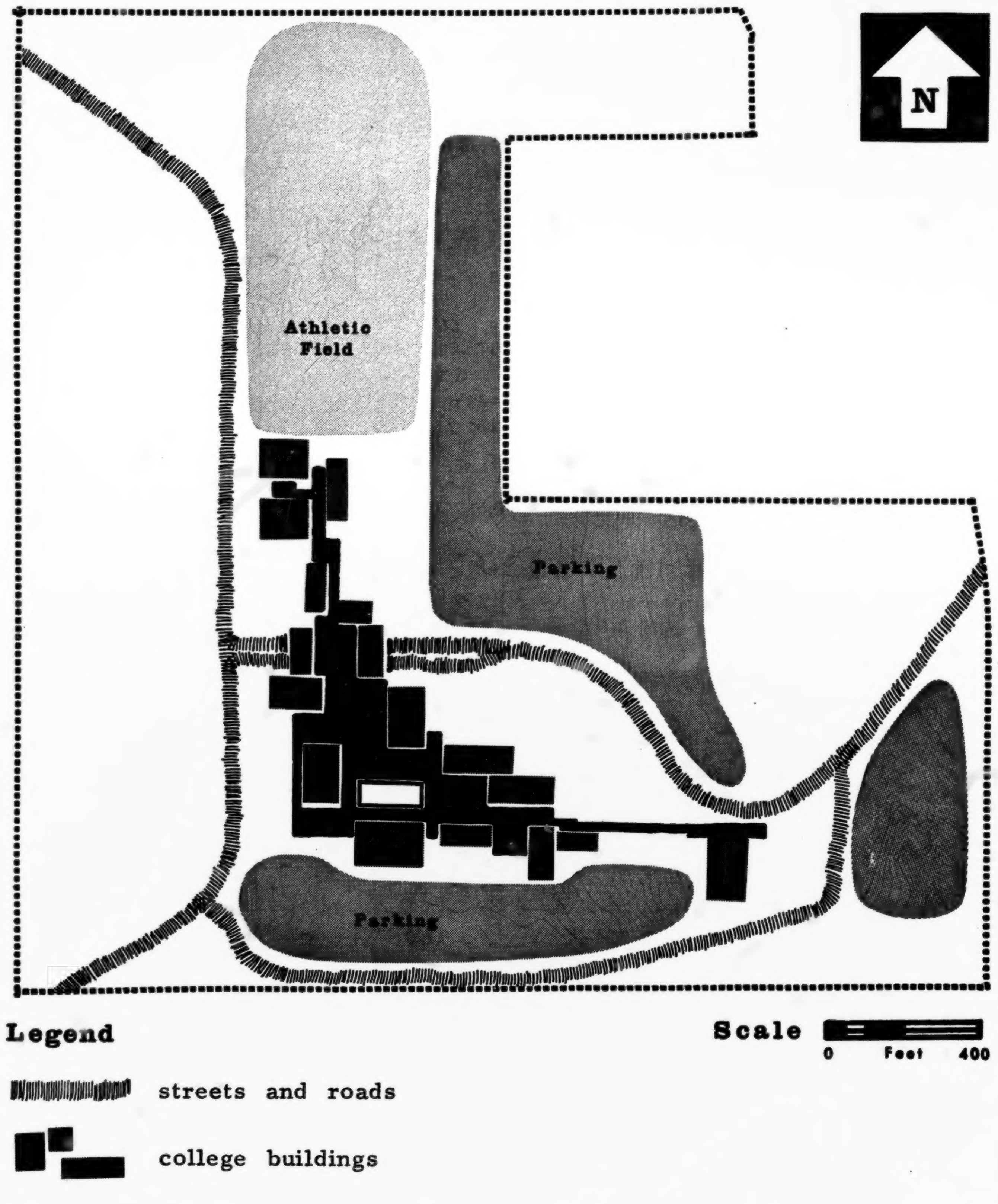
CAMPUS MASTER PLAN ALTERNATIVE 3

campus is remote, and visitors approaching the campus are confronted with the unaesthetic view of the largest parking areas.

The limitation placed upon expansion by the terminal buildings is not offset by the visual attraction of the building at the ends of the spine, and the grade change which occurs at each end would result in expensive expansion in the future. This scheme was rejected.

A curved linear development following contours of the site forms the basis for *Alternative Four*. The central pedestrian circulation artery is seen here as a linear commons that progresses through a series of spaces of various sizes and shapes and which gradually turn toward the central space enclosed by the major campus buildings. The north end of the commons terminates at the athletic complex, making it an integral part of the campus structure. The east end terminates at what might be a future auditorium. The main entrance road to the campus intersects the pedestrian commons, either by passing beneath it with facilities for loading and unloading passengers and with guest parking, or with entrances at each side of the commons and at the same level.

Alternative Four has all the advantages of expansion evident in the two previous schemes. The curved spine relates well to the contours of the site and the intersection of the main road system with the pedestrian circulation commons. This intersection forms the main entrance and is permanent, positive, and easily identified. There are several disadvantages to this scheme. From Interstate Highway 90 the college would be seen over a large parking area, there is no strong pedestrian tie to the surrounding area, and the pedestrian commons terminates at one end at a


N
Athletic Field
Parking
Parking
Legend
Scale
0 Feet 400
streets and roads
college buildings

CAMPUS MASTER PLAN ALTERNATIVE 4

facility that may not be constructed for many years. While there were several disadvantages to this scheme, it was felt that they could be overcome. This scheme formed the basis for the Bellevue Community College Master Plan presented in the following section.

The Campus Master Plan

Design Concept

A design concept is an abstract idea generalized from particulars about a problem. There are several particular concerns from which the Bellevue Community College concept has evolved. Most important among these is that the college be responsive to the changing needs of the rapidly growing community it serves. Change is no longer a periodic occurrence to which one adapts as it has been in the past; it is, and will increasingly become, a way of life for future generations.

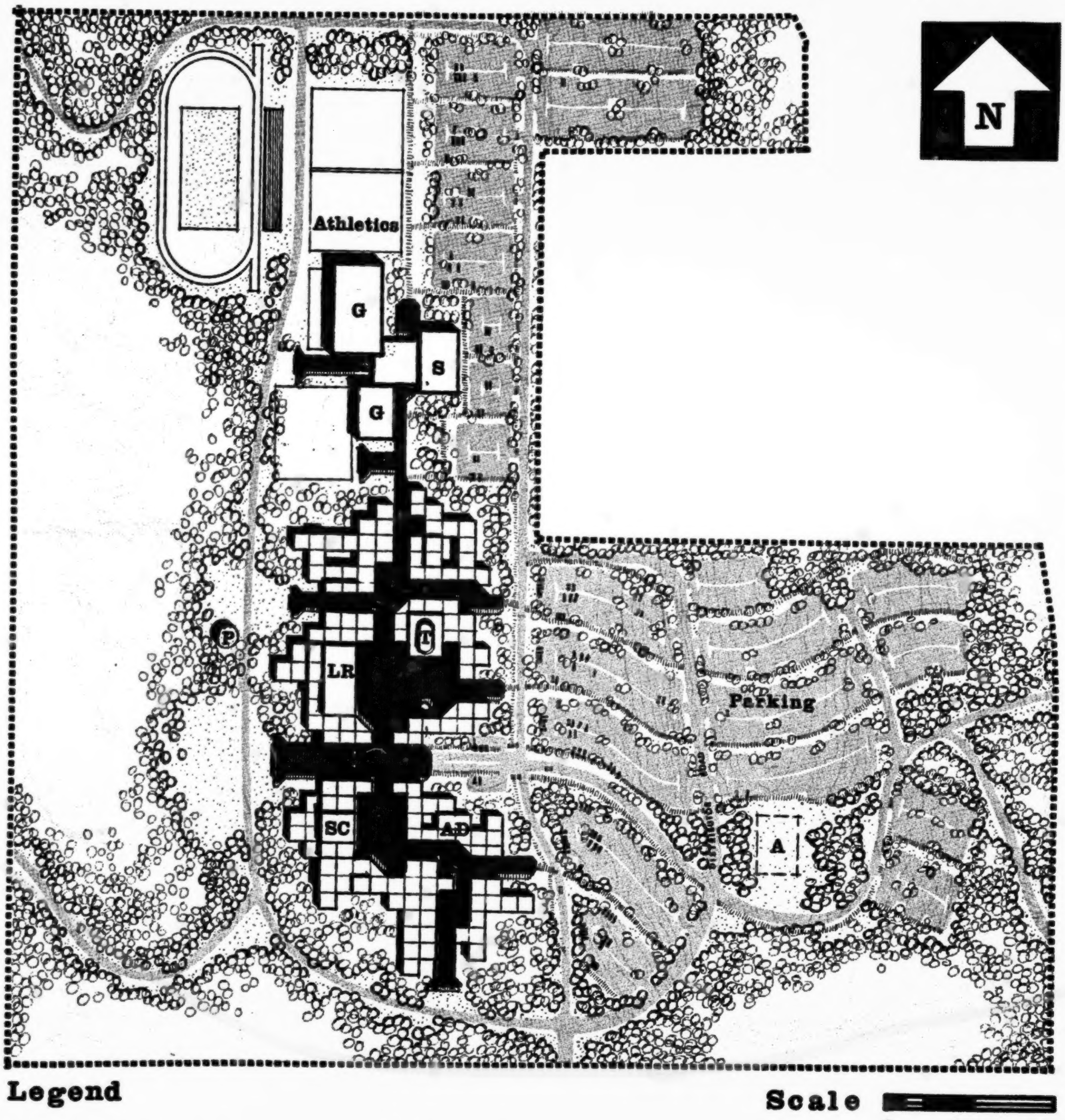
A second concern was that of "character." In view of Bellevue's location as the center of an area whose population is expected to reach 400,000 in twenty years, it was felt that a compact, vital college which maximizes interaction was most appropriate.

Conservation of the natural site has been a third concern in the development of the design concept. While buildings, roads, and, particularly, parking take a heavy toll in the natural vegetation of the site, it is important that areas be reserved for academic use in the life sciences, for relaxation and meditation, and for means of increasing the excitement of the center of the college by contrast with a surrounding buffer of vegetation.

The primary pedestrian commons is formed by the buildings that abut it and is constructed in the early phases of development. Students will step from wooded paths through secondary entrances leading from the parking areas into a highly organized urban area of modular buildings with opening and closing spaces along the pedestrian commons, vantage points for watching the passing crowd, protected places to sit and study or talk, suntraps for relaxing, open spaces that invite groups to gather, and outlooks that command the distant views.

In contrast to the constantly changing exterior of the college, the pedestrian commons becomes a permanent form on the campus. Additions are made directly to existing facilities along the periphery of the college whenever necessary and facilities will be added at either end. Great variety of visual expression will be possible within the modular structure. Walls with large doors for moving heavy equipment in and out of the vocational-technical shops, window walls for offices, glass walls for art studios, solid walls, and any other wall treatment required by the educational program to be enclosed can be provided and will add to the visual interest of the college.

The college buildings will occupy the north-south plateau of the site to minimize the inflexibility and cost which would result from building on the more steeply sloping areas. The pedestrian commons will follow the contours of this plateau, terminating at the north in the athletic complex and at the south in the local retail area where college supporting facilities are expected to develop. Parking, requiring an estimated thirty-five acres of land for 3,500 automobiles when the campus


N
Athletics
G
S
G
T
LR
P
Parking
SC
AD
A
Scale
0 Feet 400

Legend

SC student center

AD administration

LR learning resources center

T theater

G gymnasium

S swimming pools

P planetarium

A proposed auditorium

THE CAMPUS MASTER PLAN - ULTIMATE

reaches its ultimate development, will parallel the linear development of the pedestrian commons to the east, with the steeper west slope of the site remaining a natural area.

The design concept envisioned three degrees of flexibility in the buildings:

1. Buildings that would be relatively inflexible, such as the planetarium and small theater.
2. Buildings with a permanent core to which incremental additions could easily be made, such as the learning resources center and student center.
3. Buildings with areas of uncommitted space which will bear the major burden of change and require the highest degree of flexibility.

The Master Plan illustrates a scheme utilizing square modular buildings, thirty-two feet on a side, with individual heating and ventilating units and capable of being combined to form large enclosed spaces.

It was felt that corridors, classrooms, laboratories, and offices could be located anywhere within these spaces, and that the modular units could be used for one- or two-story structures if economically feasible. During the design development phase it was found that this concept of independent squares would be modified by both the pedestrian circulation system and the mechanical system. Both involve a pattern of flow from the central spine to the extremities; one of people and the other of mechanical services. The result of this determination was a modification of the structural system from a two-way system of squares to a one-way system of beams and girders in which the girders, spanning sixty feet, carried the mechanical services, and the paths of circulation flowed around the columns.

This also meant that the mechanical units, which presented a serious problem in the expansion of the squares to a second floor, now could straddle the girders and mechanical services could travel vertically through the columns.

With the development of the one-way system, the design concept gained strength. The campus was now laid out as a series of horizontal girder lines crossing a single vertical spine. The central pedestrian spaces, the courts, squares, entrances, and walks were then deliberately cut into this series of horizontals with no objective other than that of creating a progression of exciting spaces for people. To keep the strong horizontal girder lines from appearing to close in on the spaces, a "liner" of permanent facilities was created. Brick "cores" containing stairs, elevators, toilet facilities, and faculty offices were developed between the continuous covered first and second floor pedestrian circulation space and the central pedestrian commons. Growth in this scheme is now of three kinds:

1. Additional girder lines can be added to incorporate new facilities at each end of the campus, creating new spaces along the pedestrian mall lined with new core elements as required to serve the added space.
2. Girder lines can be extended laterally to add to existing departments, with small open courts being left between old and

new if desired.

3. A second floor may be added over any thirty-two by sixty foot increment as required.

At this point in the development of the college a new factor emerged which resulted in a final modification to the design cost. The long span, structural girders carrying the mechanical services, the large mechanical tunnel running beneath the pedestrian mall, and the highly developed mall itself had carried the scheme beyond the limits of the Bellevue budget of $6,000,000. It was decided that while the minimum column-free area must be at least thirty-two feet, this was not dependent upon the sixty foot span which was then sharply reduced to twenty feet. There remains the possibility of having column-free areas thirty-two feet wide and any length.

This same modification eliminated the mechanical spaces provided within the girders and which now had to be provided elsewhere. This problem was solved by changing the span in the opposite direction from repetitive thirty-two foot bays to alternating thirty-two and twelve foot bays. The twelve foot bays solved several problems. The ceilings were dropped down to eight feet to provide space for horizontal mechanical runs which serve the adjacent higher-ceilinged, wider bays. They provide circulation space perpendicular to the pedestrian mall, and they provide the low-ceilinged "servant" spaces (offices and storage areas) required by classrooms and laboratories. Vertical circulation, which travelled within the columns prior to this modification, is now housed in shafts located in the center of each twenty foot bay against the walls within the twelve foot corridor-servant spaces. These shafts will contain fire hose cabinets, drinking fountains, electrical panels, plumbing risers, and other appurtenances as required.

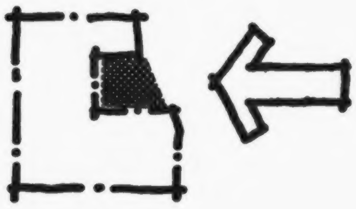
The relatively high cost of the mechanical system in the initial scheme was found to be in the initial cost of the central heating and cooling facility which supplied localized fan units, and in the cost of the primary mechanical tunnel running beneath the pedestrian mall. This was modified by eliminating the central facility completely, making the localized fan units self-contained heat pumps.

The pedestrian commons, highly developed in the first scheme, will have more areas of ivy and fewer areas of paving. As the student population grows the planted areas will be reduced to provide additional paved space for circulation and student congregations.

It is important to recognize that a compact "one-building" design concept implies a fireproof structural system of concrete, masonry, or protected steel which results in costs higher than those of wood structures having considerable separation between buildings. The structural frame of the Bellevue College will be a system of precast columns and beams spanned in the opposite direction by precast concrete "tee" sections. The "core" elements lining the pedestrian circulation areas will be load-bearing brick, and will provide "shear" resistance for the concrete frame to which they attach. Infill walls will be stucco. Windows will have anodized aluminum frames and be double-hung where operable. Floors will be concrete with carpet or vinyl asbestos tile coverings as required. Paved surfaces on the exterior will be smooth finish concrete, exposed aggregate concrete, and brick. Handrails, benches, panelling, and furniture in selected areas will be of wood. Interior partitions are relocatable on a two-foot module in one direction and a four-foot module in the opposite direction. Ceilings and soffits will be suspended throughout except in certain shop and warehouse areas.

Land Use

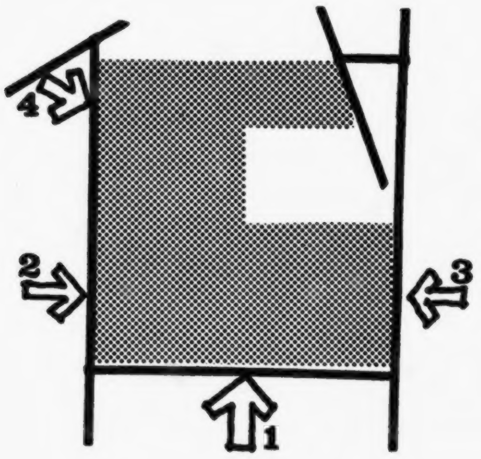
The academic core will occupy the central plateau of the site, with the pedestrian commons extending north to the athletic complex and south to a connection with the adjacent shopping area. Surrounding the complex will be a buffer of natural vegetation of sufficient depth to allow future lateral expansion of the academic core into the buffer without completely eliminating its effectiveness. To the west the site will remain as it presently exists. Parking will occupy virtually the entire eastern portion of the site beyond the green buffer zone, unless some radical change in the local transportation picture occurs. It has been recommended that the college act now to acquire the large area projecting into the eastern section of the campus which is presently zoned for residential use. Acquisition of all or part of this land would preclude the future necessity of parking east of the north-south ridge which would limit walking distances to the academic core while preserving a natural topographical



buffer between the campus and the projected freeway ramps to the east of the site.

Circulation

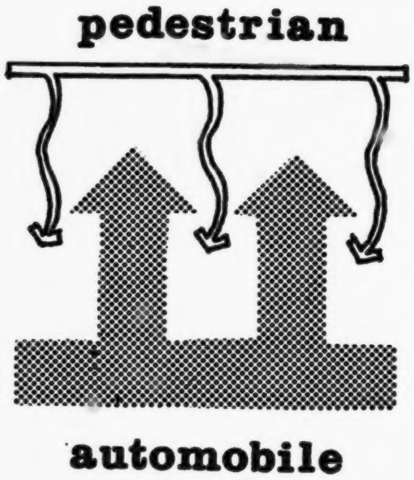
The object of the circulation plan is to provide smooth traffic flows when the college reaches its projected capacity. The plan incorporates a ring road outside the campus site; a ring road on the campus; a major distribution road; and student, faculty, and visitor parking areas. Major changes in the surrounding road system will be required by state and local agencies to complete the outer ring road system, but a willingness to make these changes has been assured.

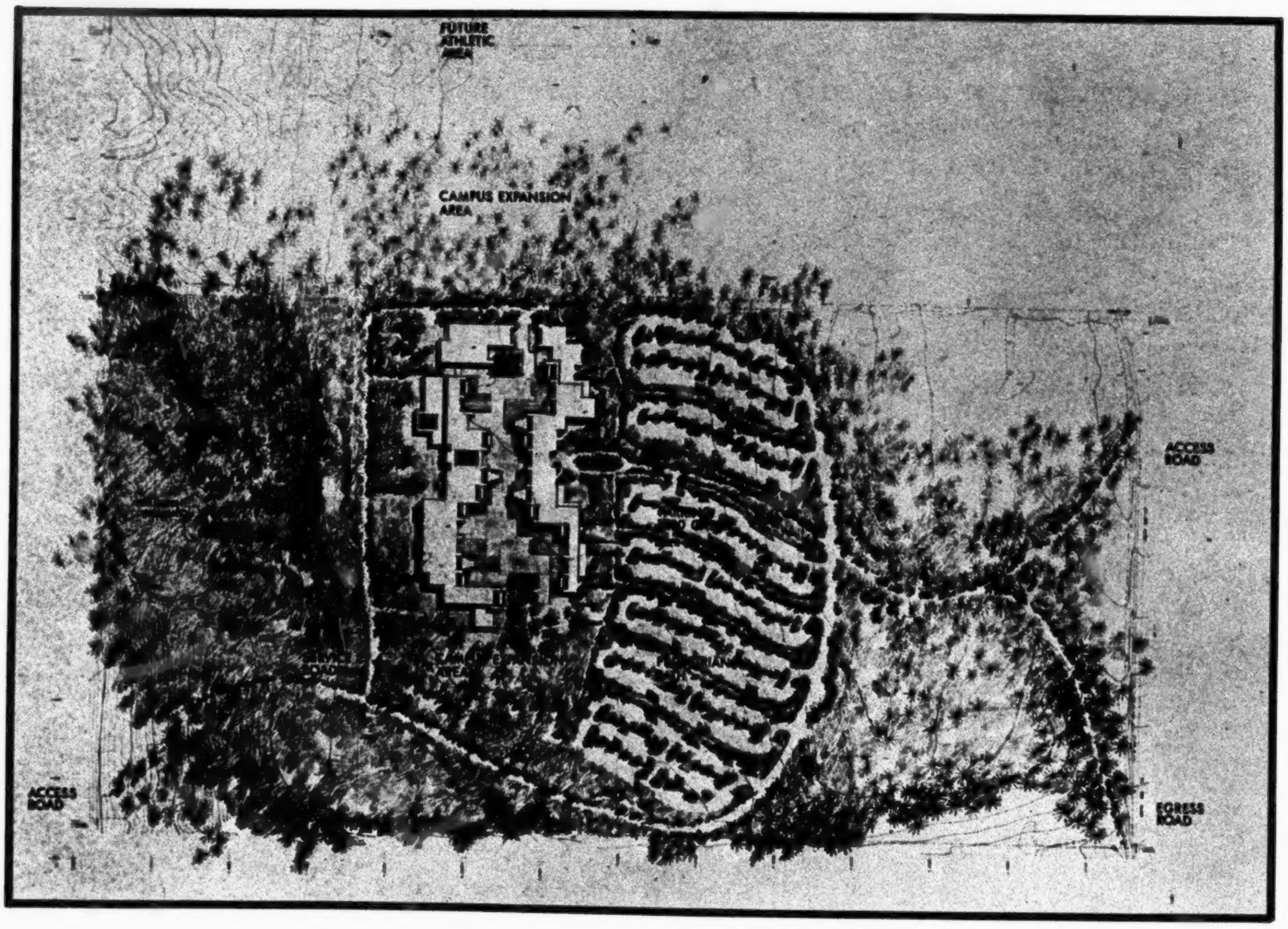


potential access

All points of access to the campus were evaluated. Some were dismissed while others were strengthened due to access demands from different districts, physical features, local highway planning, or architectural planning objectives. Four points of access are recommended in the Master Plan, each serving different parts of the community. The inner ring road, which will eventually surround the campus, will carry student traffic from the west side of the campus to the parking areas on the east, provide services to all buildings, and lead visitors to the college entrance at the center of the core. The primary distribution road is located east of the major parking areas to eliminate the conflict which would result from having students move from the parking areas across a major circulation artery into the academic area.

Parking will be limited to relatively small blocks of cars with intermittent clusters of natural landscaping to eliminate the unsightly appearance of large paved areas. From the parking areas, landscaped pedestrian walkways will lead to a variety of small entrances in the central commons where an attempt is being made to balance the commuter aspects of the college with a dynamic pedestrian concept. Though the automobile is germane to the functioning of the college, it must be recognized that the significant social and intellectual human interchanges will occur in the plazas and in the central commons.

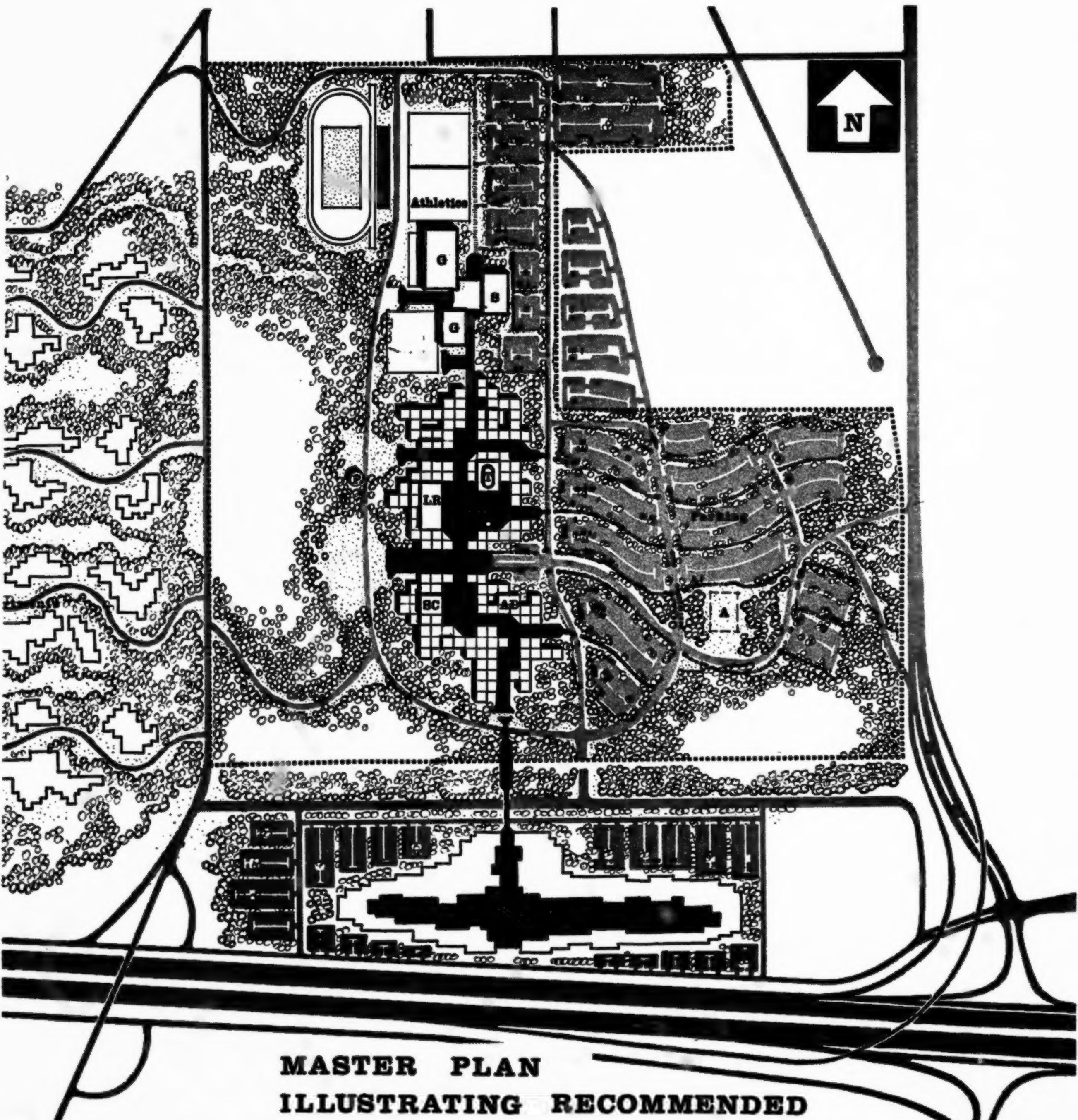



FUTURE ATHLETIC AREA
CAMPUS EXPANSION AREA
ACCESS ROAD
ACCESS ROAD
EGRESS ROAD

Planning

The college Master Plan pictures an ultimate campus of 4,500 students with illustrations for intermediate phases of 1,500 and 2,500 students. More than 4,500 students can be accommodated in the future, should it become desirable to do so.

Presently, construction documents are being prepared for phase one, which will accommodate 1,500 students, have an area of 183,680 square feet (according to the state matching formula which computes covered walks at one-third), and will cost six million dollars. Occupancy is scheduled for September of 1968.


N
Athletics
G
S
G
LR
SC
AD
Parking
A

MASTER PLAN
ILLUSTRATING RECOMMENDED
ADJACENT DEVELOPMENT

Feedback Loop One

All conference participants were assigned to one of four small discussion groups, with each group consisting of an equal number of architects and educators. Following the general sessions of the conference (see Program, Appendix A) the groups met to discuss the information presented and to develop questions. In turn, the questions were "fed back" to the conference speakers by the discussion group leaders for clarification and answer.

Feedback Loop One represents some of the questions generated by the discussion groups in response to the presentations of Robert Reed, David Hoedemaker, and Merle Landerholm.

1. How is evaluation integrated into the planning process for a project which is developed in stages?
2. To what extent should parents, faculty, and students be involved in the educational planning of an institution?
3. How do you determine the numbers of students that will be

served by the various programs (academic, vocational, technical) the college plans to offer?

4. Who in the team effort becomes responsible for the compiling and editing of the voluminous amount of communication and other materials resulting from the planning, programming, designing, and construction phases?
5. Emphasis was given to the use of building design to increase faculty-student contacts. How is this accomplished without decreasing faculty-faculty contacts?
6. Who decides on the rejection of the alternative plans?
7. Are site demands of greatest importance?
8. When an enrollment of 1,500 students represents the first phase planning of a college whose projected size will be 4,500 students, is the first phase a miniaturized program or will certain parts of the total program be introduced as the college grows?
9. What are the reasons for constructing central core buildings on a partial basis and adding to them in the future, rather than completing them immediately and temporarily assigning some of the unused building space for classrooms? For example, why construct a library for only 1,500 students when the maximum enrollment is projected to 4,500 students?
10. How will the Bellevue campus plan lend itself to expansion? Can the campus grow and still retain the space and spine relationship?

Case Study Two
Golden West College
Huntington Beach, California

TOWARD INNOVATION: THE GOLDEN WEST COLLEGE STORY

R. Dudley Boyce

Education is now universally accepted as freedom's most meaningful investment. Assured stature and respect, described as the wealth of a nation, education must accept in full measure the challenge placed before it and meet the expectations held for it.

Generation after generation we have viewed educational opportunity expansively. Now a tremendous demand for higher education is stirring among the young people of our country. This is a force that will not be denied. In recent years a re-examination of our traditional structures of higher education has placed particular emphasis on the role played by the community college. This year, 70 per cent of those who enter college as freshmen in California will choose a community junior college education as their initial investment in opportunity. Seventy-nine colleges are facilitating training centers for over 300,000 youths. This figure is to double in a mere handful of years. It is estimated that by the early 1970's better than 55 per cent of those who will earn their baccalaureate degrees in California's senior colleges and universities will have begun their higher education at home--in their community's college.

These statistics say nothing about the prodigious efforts which must be undertaken in the retraining of adults. One of the interesting things we realized when we opened our doors last fall was that 40 per cent of our first class--in the day college--as well as 89 per cent of our evening students--were adults. They were there to protect their careers, sharpen their skills, or undergird themselves for new opportunities.

I refer to the recognition of the opportunity for education as an investment that will continue to cause burgeoning enrollments. Golden West College offers such an investment. As a new institution Golden West College is relatively free of the restrictions which have grown up in established, traditional approaches. The opportunity and challenge of facilitating student learning through responsible experimentation and innovation have been accepted, indeed, encouraged by faculty, administration and the Board of Trustees.

The college opened in September, 1966, in a new, carefully planned $5,000,000 increment. We are located in one of the most rapidly growing areas of the Southern California megalopolis. The initial enrollment of regular day freshman and sophomore students exceeded 2,000. Some 3,000 additional persons are pursuing lower division and adult education studies in the evening college, as well. As Mr. Sink will relate to you, this is just the beginning. If we can finance our expansion potential we should exceed 5,000 day-time enrollees in the early 1970's, and stretch out to provide for 10,000 in the 1980's. We expect the district's experience in providing educational services for twice as many evening students as we serve during the day may soon be a measure in parsimony.

You will learn that we are modular in our thinking. William Pereira and Associates wisely committed us to modular planning of facilities in order that we may enjoy the freedoms and flexibility such planning provides. It might be said that we are developing a modular approach to curriculum planning in order that we may facilitate responsiveness to changing conditions while adhering to expressed institutional philosophy and goals. Undoubtedly one would perceive that our schedule reflects some conceptual blocking, as well, for we must relate our offerings to variable periods and amounts of time our students can give to academic pursuits.

The educational process must be, above all, dynamic. Its substructure is curriculum, and once this becomes absolute and unchanging, creativity and innovation are discouraged and, eventually, inspired teaching and learning will die.

Community junior colleges are distinctive among institutions of higher learning in the emphasis they place upon teaching. It is therefore surprising that often they allow themselves to become so inflexible in their approach to learning. This is especially paradoxical in light of the difficult teaching-learning problems posed by the heterogeneity of their students and the diversity of their curricula.

We would like to gain stature and momentum as an experimental college. Already our appetite is whetted by a challenge that is perhaps existential and pragmatic. Our faculty at Golden West College has presently agreed to analyze and test the application of curricular design to the generally accepted variables in learning--characteristics of the learner, the nature of that which is to be learned (the tasks themselves), and the instructional resources employed. Basic assumptions are that the relationships among selected student characteristics, learning tasks, and instructional resources have not been studied in the junior college context. An understanding of these relationships will permit change which may facilitate student learning. In undertaking a dynamic approach we are aware that we must undergird our efforts with institutional goals, and define outcomes in terminal performance and measurable terms.

We sense a sort of bewildering excitement over a whole constellation of new experiences. Conventional approaches are giving way to audio-tutorial instruction in laboratory sciences. We are undertaking a contemporary problems approach to interrelated disciplines in the sciences, humanities, and social sciences. We are free to try some team teaching, some open-end scheduling. Several of our faculty are now conceptualizing the application of the computer to management games, math problem-solving, and materials testing--as in technology. Students are given to self-instruction in remedial exercises and skills under supervision. Students are teaching and thus are learning better than when taught. They are already involved in the community through welfare work of civic associations.

I would be remiss, however, if I offered only the buoyant spirit without assuring you the stability of commitment. Further, I would hazard an implied lack of respect for our big sister, Orange Coast College, if I were to fail in showing respect for our heritage. Our district enjoys twenty years of experience in the formulation of institutional goals. These constitute the honored shibboleths that assure Golden West College its rights of passage to the profession.

We may more clearly characterize this institution by referring to six values that undergird its current development--values which represent accepted practices in the functioning and operation of two-year colleges--values which can serve as guide lines for use in establishing an experimental junior college:

1. The junior college is assuming sharply increased responsibility for preparing students for upper-division work at universities and other senior institutions. We accept the responsibility to offer meaningful preparations to this end.
2. The junior college is assuming major responsibility for occupational-technical education. We are committed to a rational approach to providing students with solid foundations in career preparations.
3. Thus, we accept the challenge that Golden West College will become a vibrant, comprehensive institution which programs preparation for immediate employment as well as education for transfer.
4. Respectful of our heritage we accept the "open door" philosophy. Moreover, we hope that we may make our programs so resourceful and productive that we avoid the "revolving door" actuality. The concept of the open door college is consistent with our ideal of educating every citizen to the level of his highest

potential. And we recognize the fact that many of our young people are "late bloomers."

5. Guidance is recognized as an important responsibility of the junior college. Through a new, and rather unique approach to counseling, every member of our faculty commits some of his time to the counselor role. Indeed, we see as perhaps our central purpose helping students, as individuals, to face the reality of their situations. As many come to college with either high ambitions, or on the other hand low motivation to serious purpose, the junior college has an obligation to help students to gain a self-concept, and to achieve self-direction consistent with realistic educational plans.
6. The junior college is a community college. Edmund Gleazer has said, "The junior college is a community!" This implies that leadership elicits total participation from students, faculty, and staff in program planning, development, and operation.

These are the kinds of ideals, values, and concerns we delivered to our architects as together we conceived a master plan. We have been rewarded by their perceptual acuity, we are enriched by their insight. At times it would appear that Pereira and Associates are better educators than are we for often their critical appraisal of what we say we want to do has afforded us—in turn—a more realistic approach to doing.

Our colleagues have expressed artistry in other dimensions, as well. One senses an appreciation for aesthetics, in spite of the functional edifice that describes structure. There is an aura of humanism in their planning, too. Allow me in finalizing my contribution to this discussion to reflect on this kind of contribution. Of Golden West College and its conceptual design I hear the architect say:

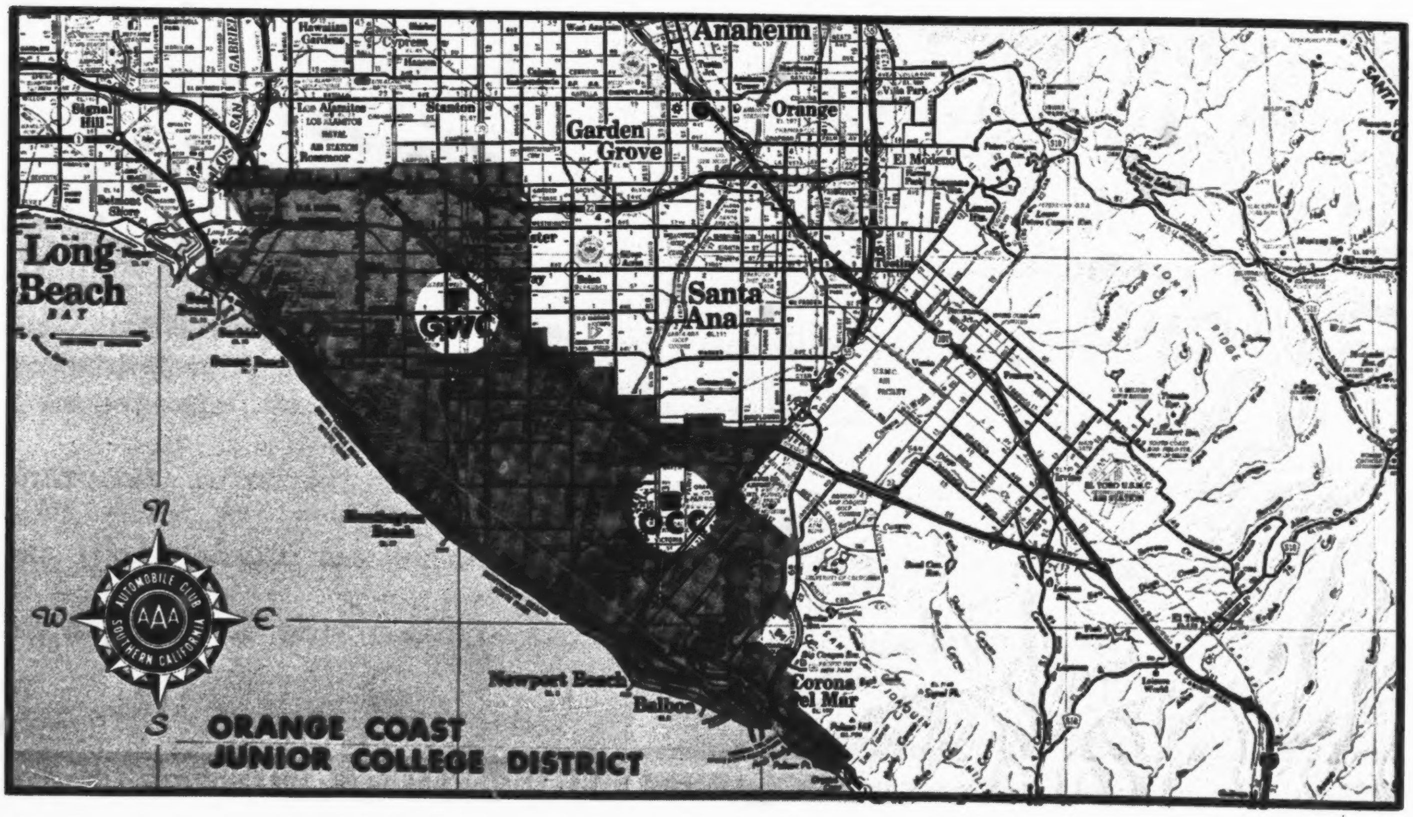
> Every person should sense a feeling of motion and activity, here, that is both vigorous and subdued; the facilities should convey a buoyancy and industry. We should engage a sense of community here.
>
> We should like the architecture to create intimacy by carefully planning pedestrian traffic, while providing space for the individual to feel expansive as he interacts with this environment--much the same as the individual who looks out over the vastness of the ocean, stands tall.
>
> As the student moves about the campus he should observe a chorus rehearsing, an artist working, a professor professing, a colleague thinking. He should see exhibited, formally and informally, the results of labor, study, and the expression of talent. He should know this as his own as well as another's. He should perceive a door opened to enrichment in an atmosphere which, at the same time, preserves the integrity for learning.

Yes, at Golden West College, we willingly admit to a bewildering excitement over a whole constellation of sensations--high aspirations to be innovative, indeed experimental, commitment to the sound purposes and values of our professional calling, a readiness to view the vast opportunities ahead of us with excitement, a determination to stand tall and to assure our people that, in this place and time, Golden West College is and will be "a lively center for learning."

GOLDEN WEST COLLEGE: AN ARCHITECTURAL SYSTEM

James E. Sink

Architecture is above all the most optimistic of the arts, preoccupying itself with the future rather than the past. Even so, while architects have often been creative, they have rarely had the opportunity to be inventive--and there is a difference. As architecture proceeds from period to period, we see the best of the works as a creative response to many of the same problems. But rarely are we asked to respond with "invention." At Golden West College, we were asked to actually design "change and growth" as opposed to merely providing for it as best as possible. We were asked to translate the technology of building into a framework to house the technology of education.


Anaheim
Orange
Garden Grove
Long Beach
Santa Ana
GWC
OCC
Newport Beach
Balboa
Corona del Mar
N
W
E
S
AUTOMOBILE CLUB SOUTHERN CALIFORNIA
AAA
ORANGE COAST JUNIOR COLLEGE DISTRICT

We were asked to enlarge a capability at least five times within the same site dimensions, and yet take the responsibility for the aesthetics as well as the solution. Our response, therefore, is an invention and hopefully a creative success as well. If this is true, it is because we sought to create not buildings, but a place--not spaces, but an environment. Although our tools were in the usual form of plans and structure, we dealt with architecture in its most basic terms to arrive at a system we could use to solve architecturally the problems of continuous growth and change.

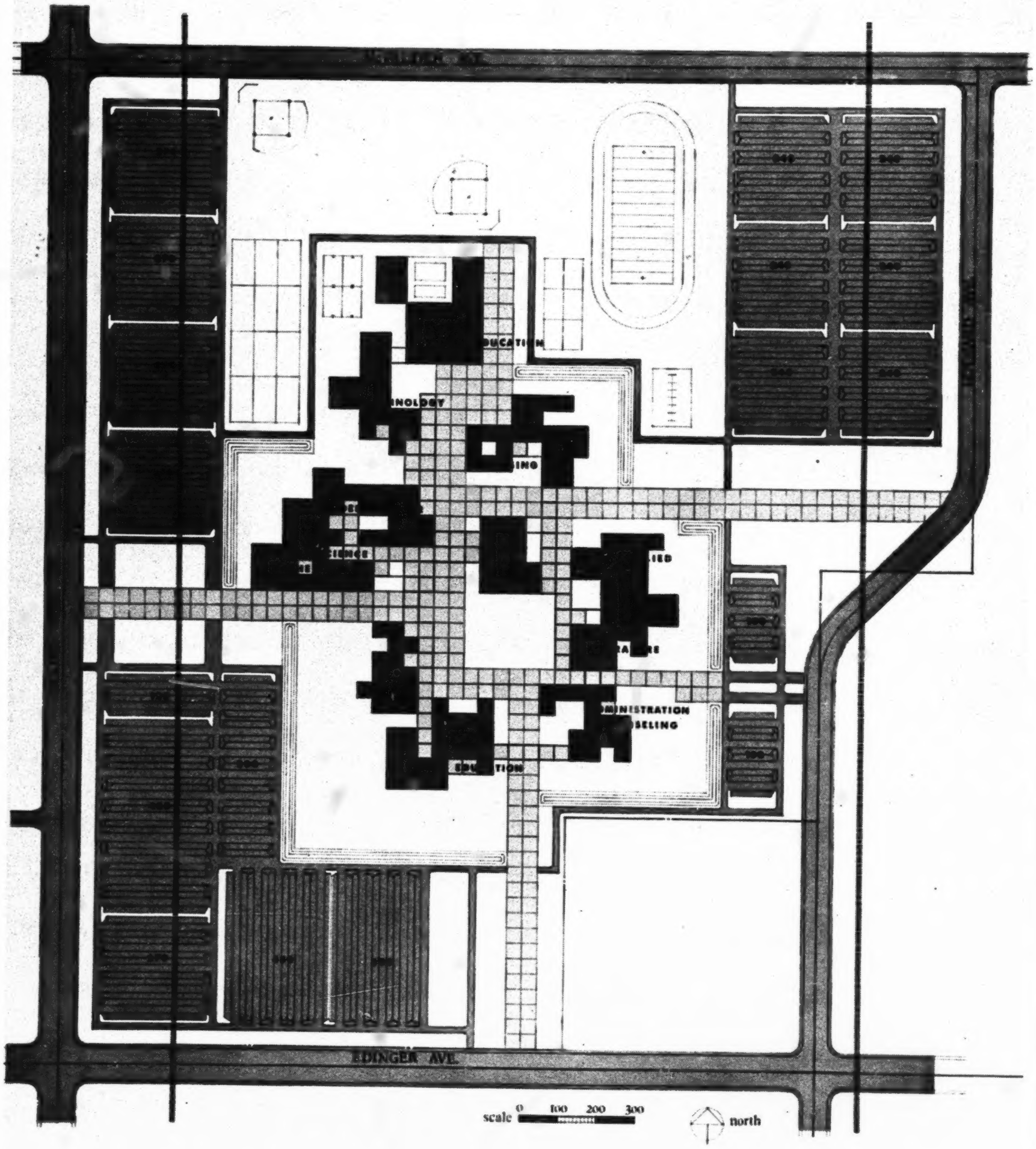
To begin with, Golden West College was conceived to meet the demands of increasing population in a district already conscious of the impact of the community college idea, since Orange Coast College has been one of the leaders in the post-war years. Golden West College was located in the district geographically to serve future students, and the site was acquired at a time when open land barely remained available. There was little choice, considering the patterns of urban development, the evolution of transportation keyed principally to the automobile, and the ponderous freeway network. Consequently, we were left with a physical frame of natural reference--a dead-level site and a white, hot sky. We were surrounded by other land of unknown destiny, threatened by the intrusion of industry, and by residential subdivisions of undistinguished character. The State Division of Highways was considering, and still is, the development of a major freeway on one side or the other of our site.

For these reasons, and because we felt it was important to create a "sense of place" for the campus itself, we concentrated the buildings in the center of the site, surrounding them on the outside by peripheral parking and athletic fields. We insulated the center from the periphery by creating landscaped berms of earth which define the interior space and enable the development of a "campus" in the truest sense. Since there was no immediate community surrounding it to which the campus could be related architecturally, the college will relate to the broader community simply by extension of its curriculum and educational programs, and the campus itself will remain an island.

But perhaps the most significant element of the plan and the foundation of the architectural system itself is the concept of "continuous structure." We felt that we had to find the means not only to respond to the changes in curriculum that are inevitable, but we had to be able to grow gracefully and easily, in small increments if necessary, as the campus expanded to meet the increasing needs of the district. Naturally, this had to be accomplished without imposing any economic burdens, either initially or at any point along the way.

The "continuous structure" principle combines, on one hand, an architectural approach to structural design that enables us to attach new structures to existing ones, together with, on the other hand, modular planning so that all kinds of spaces can be developed within a single planning module once it is free of bearing walls and fixed equipment. I plan to illustrate the building system and our concept of "load centers," but first I want to talk about the module.

The design of the total site reflects the module, which was


UCATION
NOLOGY
ING
IENCE
IED
RATURE
MINISTRATION
SELING
EDUCATION
EDINGER AVE.
scale
0 100 200 300
north

CIRCULATION • PARKING • BUILDING AREAS

selected as a forty by forty foot square. The walks, the streets, the outdoor spaces--even the landscape will eventually be developed on this grid to reinforce the design and make it possible to move in any direction that may be dictated by the functional requirements as the buildings grow.

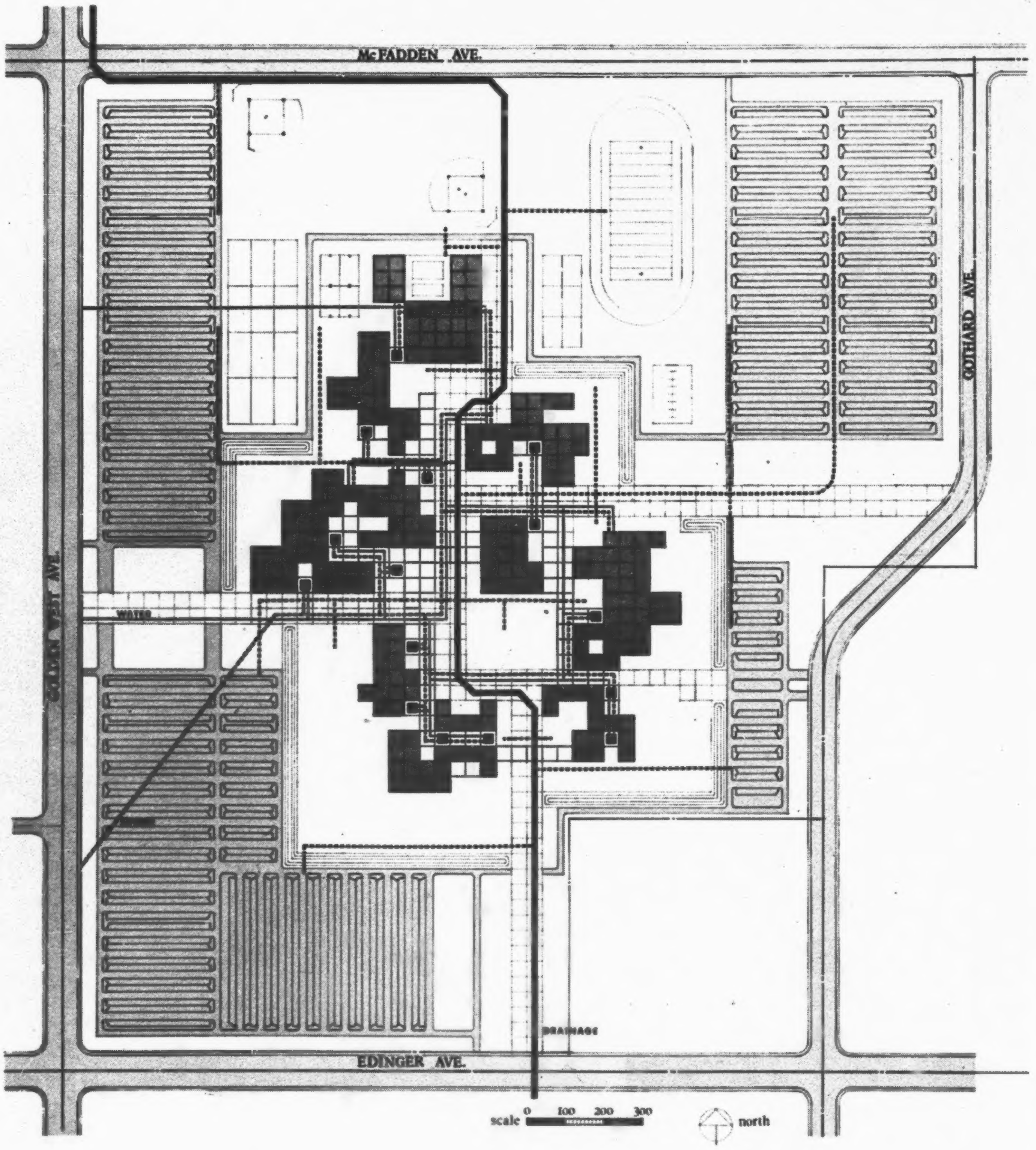
The forty by forty foot module can be adapted to various kinds of facilities and spaces, and both inside and outside courts. The different sizes of classrooms and laboratories that were contemplated, the storage and work spaces needed in specialized facilities, and relationships to faculty offices and circulation can be achieved with the forty by forty foot bay. The bay can be broken down into five foot increments which produce a ten by ten foot office, a twenty by thirty foot classroom, and so on.

The interior of the college library provides a good example of how the module will lend itself to expansion as student enrollment

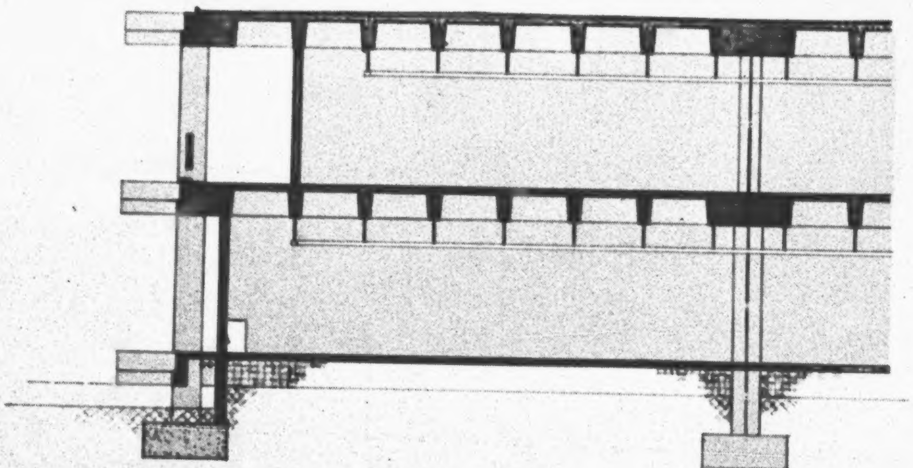
increases and illustrates, as well, how the exposed structural elements of the building provide dramatic interior spaces. The main floor contains the reading room, individual study areas, and group conference rooms--with the stacks on the mezzanine level. Initial capacity is 30,000 volumes.

There is a cohesive overall pattern and unity in the design. The principal circulation route--what we call the "main street"--will remain open at the ground level to provide a sense of orientation on the campus and connect it in all four directions to the parking and the community outside the berms; but it may be bridged over at the second floor if necessary. These principal routes (as shown in the drawing on the opposite page) also establish the location of the main utility systems, and the "load centers" are spotted in relation to the ultimate pattern of development within the module.

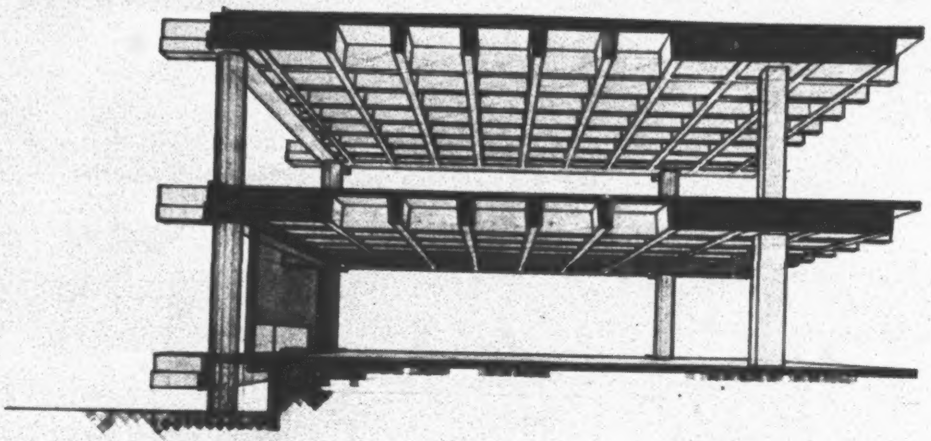
The original concept of the building systems is provided on page 102. The drawing shows the continuous exposed concrete ceiling with five foot by five foot waffle patterns to which partitions may be attached; the independent concrete columns that produce a rigid frame so that bearing walls are eliminated; the beams that extend beyond the columns in the form of "outriggers" or "haunches" designed to attach adjacent beams and floors as bays are added; and the independent lighting and air conditioning systems in the form of unit ventilators which may be moved and re-used as rooms change. We subsequently decided to expose all piping and utilities so they would be completely accessible and changeable. The system itself is so strong architecturally--the simple


McFADDEN AVE.
GOLDEN WEST AVE.
GOTHARD AVE.
WATER
DRAINAGE
EDINGER AVE.
scale
0
100
200
300
north

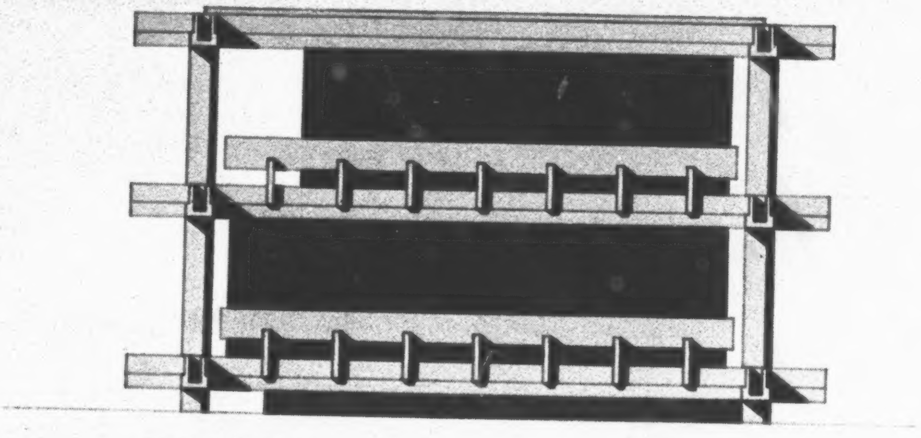
UTILITY PLAN: ULTIMATE 10,000+ STUDENTS



SECTION



SECTION

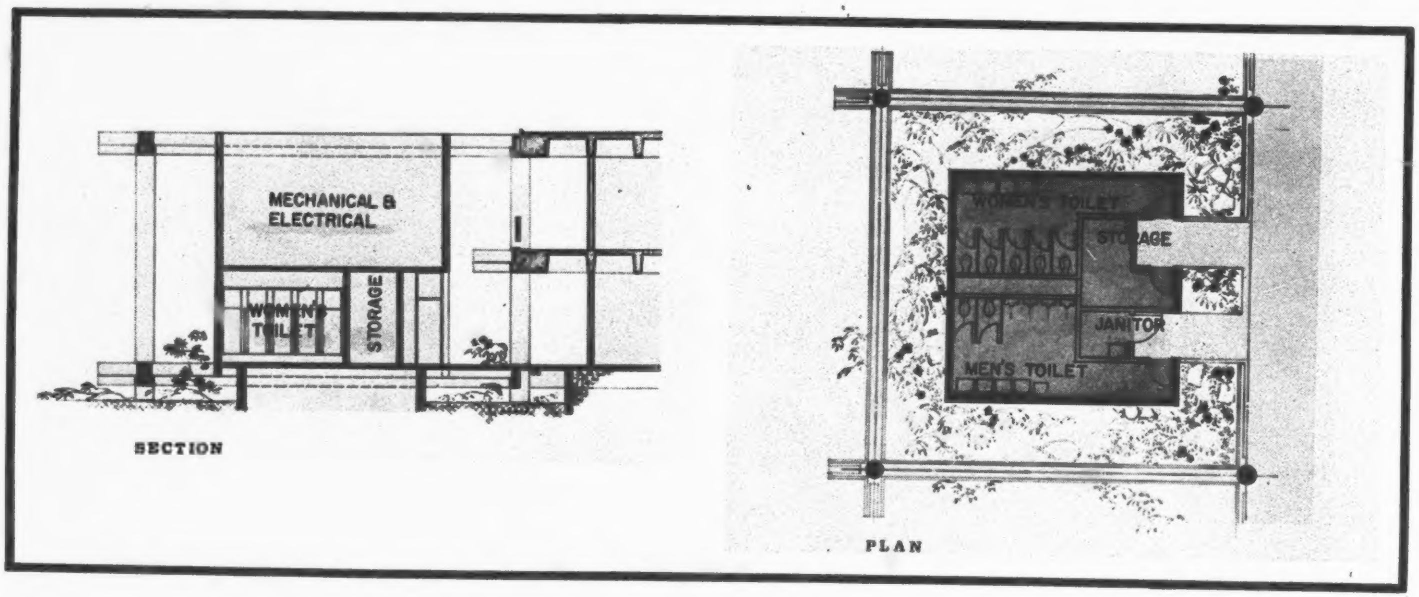


ELEVATION

BUILDING SYSTEMS

and bold form expressed by the columns, the beams, the exposed waffle ceiling and the patterns of the module itself--that we can punctuate the walls wherever we need to for doors or windows without the usual architectural concern about where they fall with regard to symmetry or balance.

Our studies showed that to utilize the advantages of the "continuous structure" system to its optimum, we should be able to create a complete environment for interior functions and, at the same time, we should free up the space from the usual fixed mechanical and electrical equipment. We needed to air condition the spaces so they could be on the interior of the module and so we could enclose them for a variety of audio-visual purposes. Furthermore, we could economize in the overall program by doing so. The "load centers" contain all of the basic mechani-


SECTION

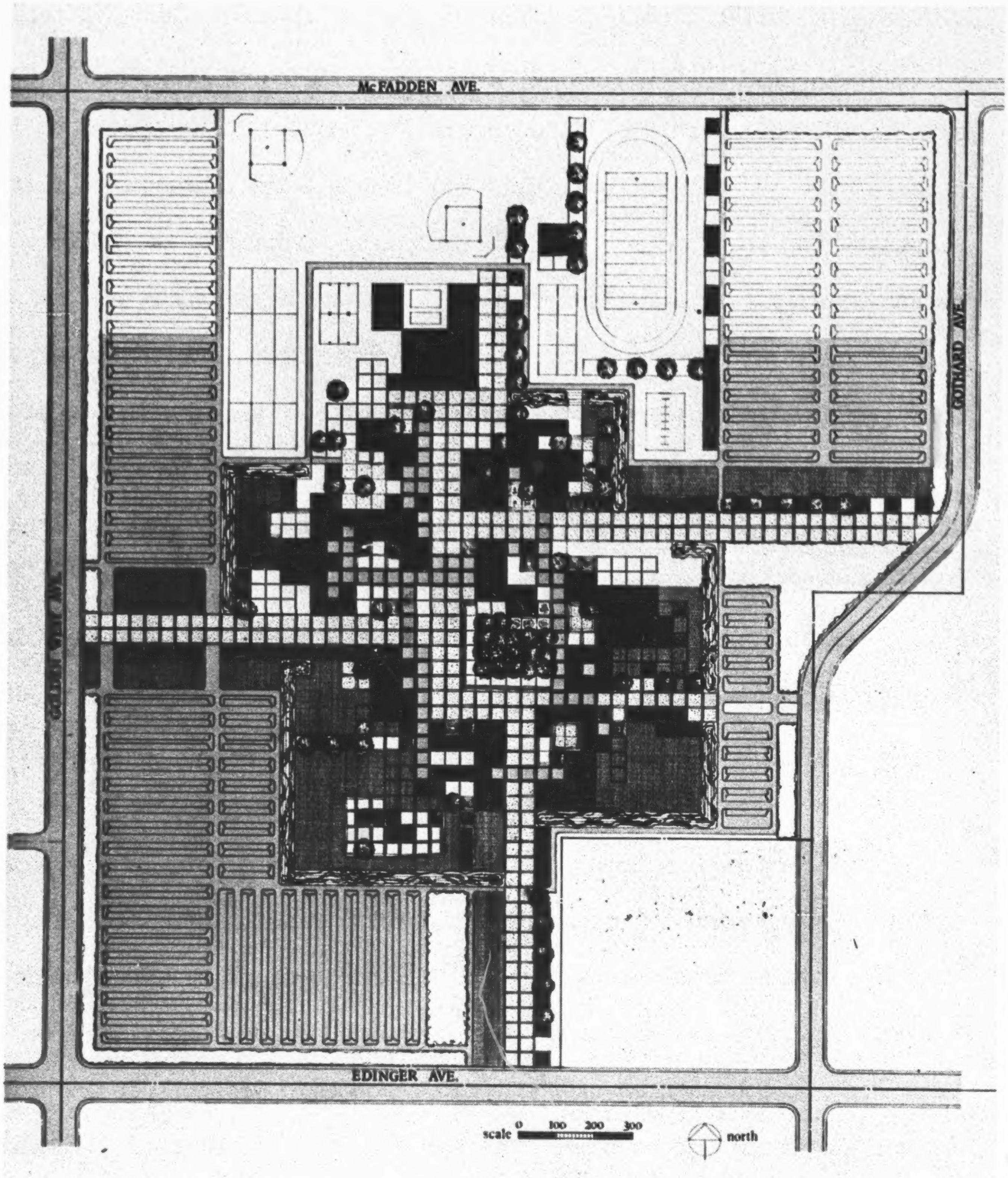
PLAN

cal and electrical equipment, switchgear, telephone, and communications systems--and all the toilets which would otherwise be fixed limitations on flexibility within the building modules. They are designed so that each "load center" serves 30,000 square feet of building area both in terms of the quantity of utilities required and the number of toilets necessary for that amount of area. As you will notice, the toilets are on the lower floor, and the mechanical and electrical equipment is on the upper floor. Each contains compressors, condensors, cooling towers, and basic refrigeration equipment to generate chilled water which is piped to the units in each room served by it. These load centers may also serve as distribution centers for closed-circuit television, computer links, and future communications or electronic systems.

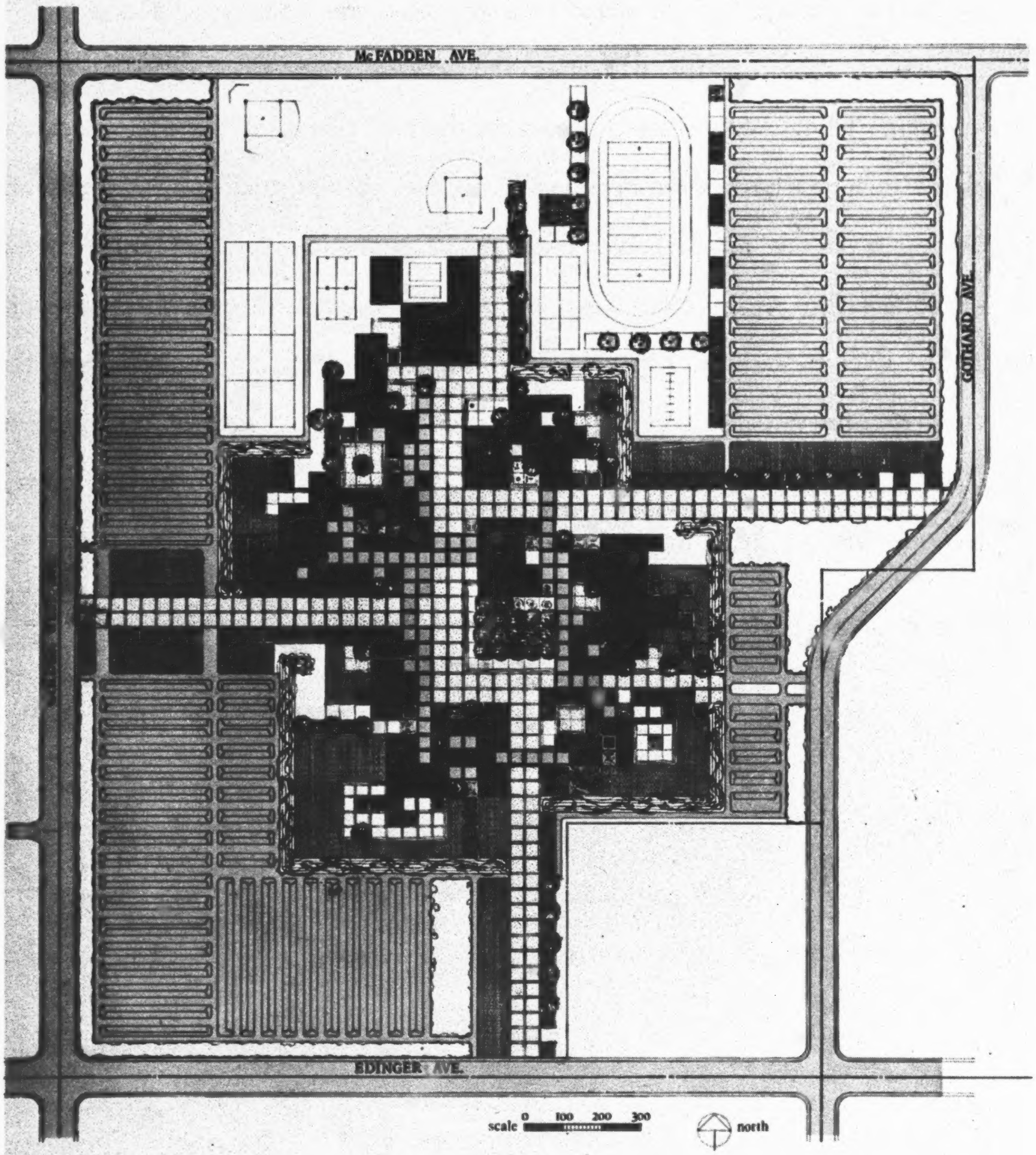
Master plans for enrollment levels of 5,000 and 10,000 students are shown on the following pages. You will notice that at the 5,000 student level the campus will have definite form but still great flexibility for movement in any direction as modules are added.

In any such schemes of flexible and organic form we must, of course, have a plan for organizing the total mass. The master plan for 10,000 students demonstrates how the buildings might be expanded at this level. The module assignments may be changed as necessary to allow for expansion or contraction of the various academic disciplines and to adjust to others yet to come. It does indicate the kind of dispersal about the campus that is possible with the scheme.

The initial increment of buildings included a 375 seat lecture hall and auditorium, administration building, library, and special


McFADDEN AVE.
GOTHARD AVE.
GOLDEN WEST AVE.
EDINGER AVE.
scale
0
100
200
300
north

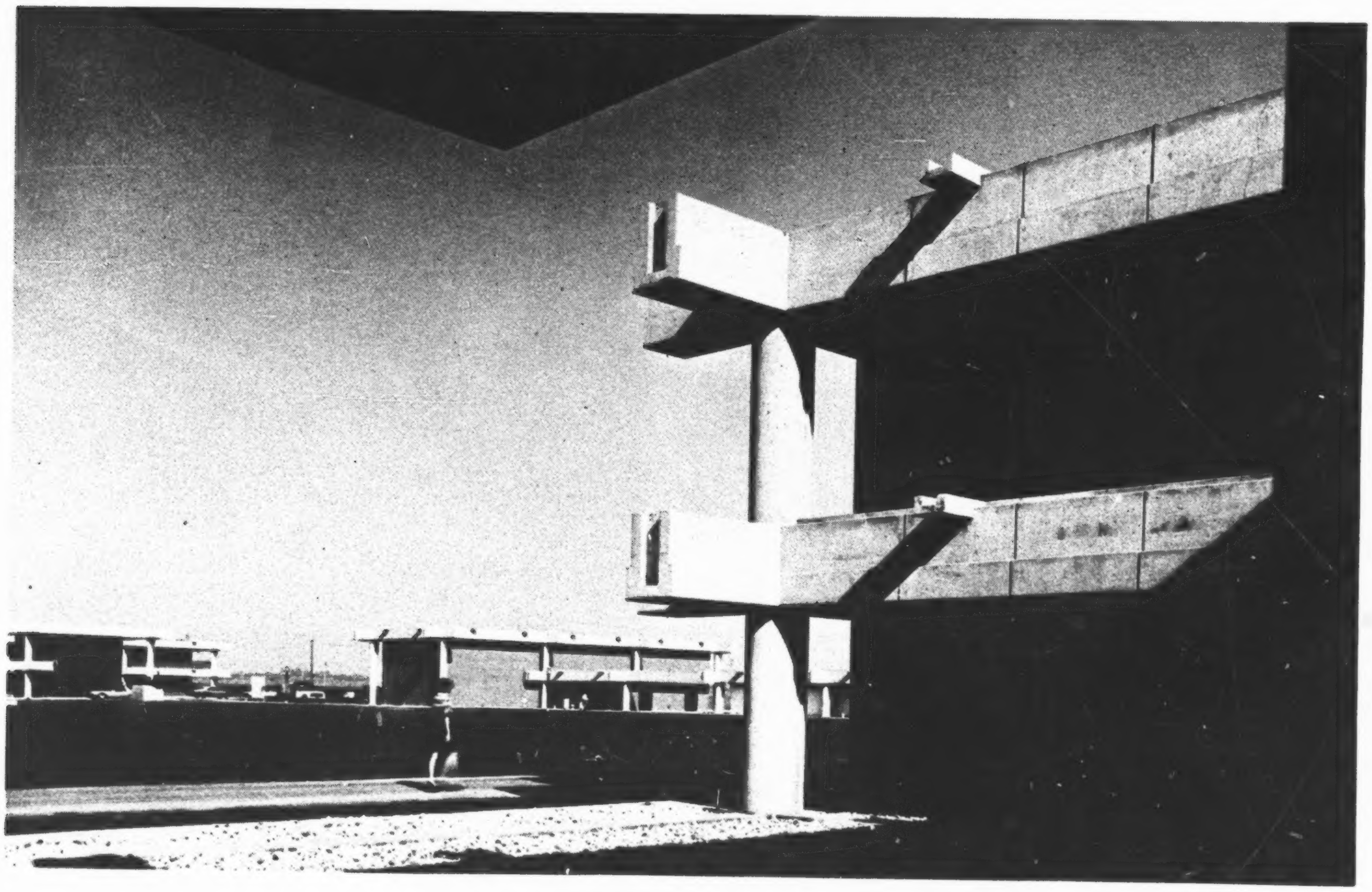
MASTER PLAN: 5000 STUDENTS


McFADDEN AVE.
GOTHARD AVE.
EDINGER AVE.
scale 0 100 200 300
north

MASTER PLAN: 10,000+ STUDENTS

classroom and laboratory buildings. Even in the beginning we had a cohesive campus. The facilities were all in their right places and we had built enough of the structure to make the campus a "place."

I should point out that the spaces programmed originally for 1,500 students have changed many times since our planning began--and always these changes have been made in response to new ideas, new needs, new concepts as the educational curriculum evolved. As testimony to the effectiveness and flexibility of the architectural system, these changes occurred not just during the early stages of design, but during the working drawings, through construction, up to the day of opening--and even since then. This relates not so much to the buildings themselves or the structural framework, but to the use of the spaces created. For

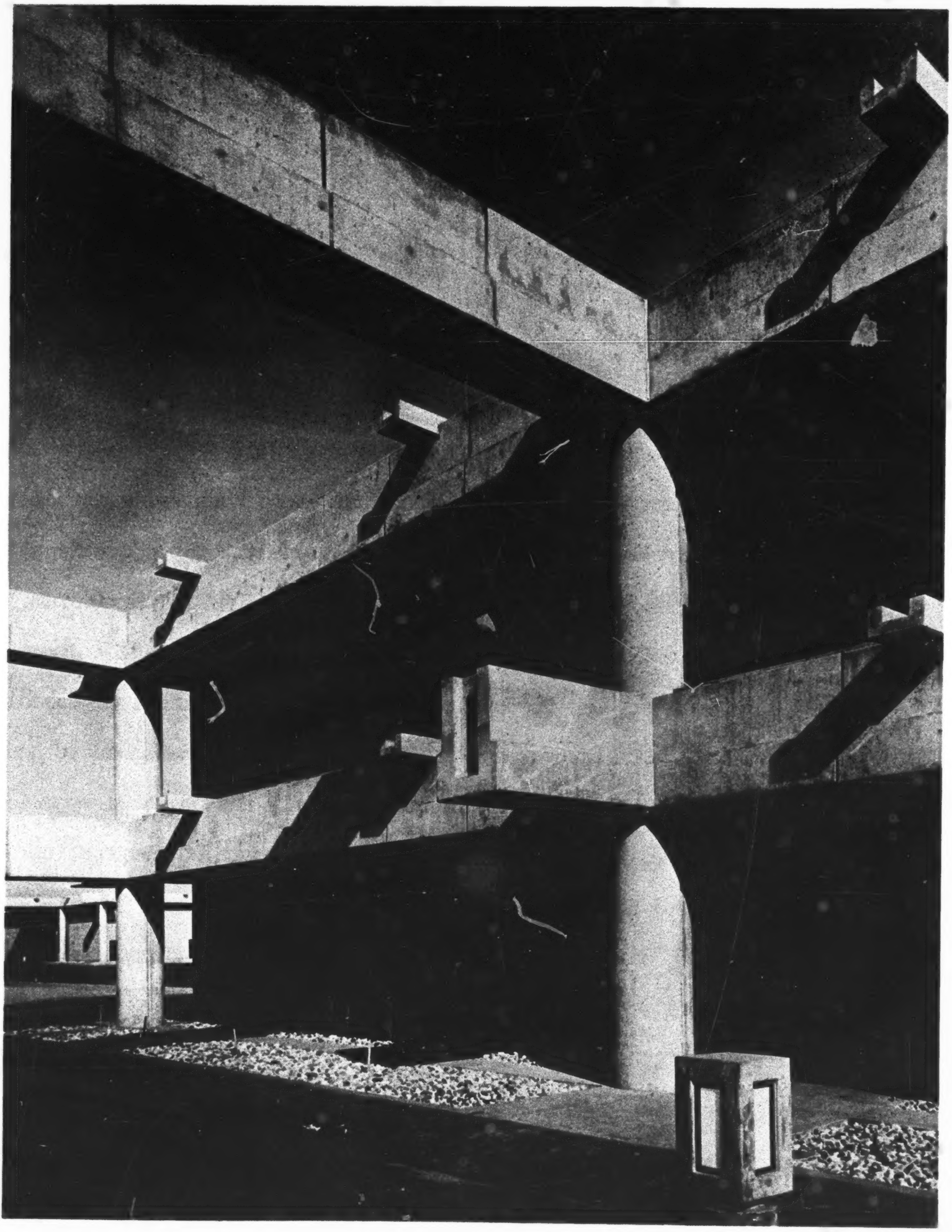


example, store rooms changed to offices, offices to seminar rooms, and classrooms to laboratories. General purpose rooms have been changed to highly sophisticated teaching facilities by the installation of special teaching devices. When the campus opened last September, it could easily accept the over 2,000 students who sought admittance.

What the students saw when they arrived was a campus that will never be complete. It is not complete because it represents only a part of the whole, and it will never be complete because even the whole itself has no end. It is a response to an ever-changing, constantly expanding, extremely dynamic educational curriculum.

It has been said, finally, that just as no hospital ever cured a patient, no school building ever educated a student. The educational process must be, above all, dynamic. Its substructure is curriculum, and once this curriculum becomes absolute and unchangeable, the dynamics congeal--improvements are discouraged and, eventually, inspired teaching ceases to exist. Similarly, when school buildings are designed to house an inflexible curriculum and, in fact, are merely the physical representation of that curriculum and nothing more, they become an obstruction rather than an aid to the teaching process.

At the outset we said that we wanted to create an architectural system that would make it possible for the curriculum--as expressed by the faculty--to directly influence the form and plan of the structures. This has occurred, and the buildings themselves are purposely designed to stand boldly as a statement to that effect.



Feedback Loop Two

The following represents some of the questions and concerns formulated by the conference participants in response to the presentations of Roger Malek, R. Dudley Boyce, and James Sink:

1. Static aspects are dealt with in planning. How do you go about capturing dynamic aspects and incorporating them into the planning process?
2. What are the methods used to determine the optimum size of a campus?
3. How does an institution evaluate the architectural effect on students?
4. In terms of cost, aesthetics, acoustics, functions, etc., what are the limits of flexibility?
5. What is considered to be an optimum amount of lead time in planning?
6. Why was a forty by forty foot module selected for the basic

design unit? What is the cost difference of this size in relation to a smaller span?

7. How are the academic, vocational, and technical programs to be interrelated?
8. When classrooms and laboratory facilities are combined, what about the utilization factor? Is not this wasted space a good deal of the time?
9. If we are concerned about the architectural and aesthetic effects of a campus, what kinds of reactions do students have toward a campus which will never be complete--one which is constantly in a stage of development and construction?

IV. IMPLEMENTATION AND EVALUATION

DO'S AND DON'TS IN COMMUNITY COLLEGE PLANNING

Lawrence F. O'Neill

Introduction

It may be of some help in communicating with you if I provide a brief summary of our development program in St. Louis. As you may know, the Junior College District of St. Louis is constructing, simultaneously, three new campuses. The city campus is a small site of thirty-eight acres, but with the largest planned enrollment--7,000. This is of necessity a high rise, compact facility. The other two are in the north and southwest county areas and both have considerably more ground.

The Junior College District's operation began in early 1963 with classes in two high schools, and a total enrollment of 800. By late 1963 enrollment reached 2,400 and by 1964 the two new county campus sites had temporary buildings with the enrollment at all three colleges at the 5,000 level. This year enrollment is 8,200. So, in four years enrollment expanded from 800 to over 8,000. In November, 1965, a $47.2 million bond issue was passed, and this, with capital reserves from operating funds, and federal grants, makes up the current $58 million development program.

We have underway at this time about $26 million in eleven construction contracts, with thirty-three major subcontractors, and hundreds of minor subs and suppliers. On the three sites, we are currently proceeding at the rate of almost $2 million of work-in-place each month.

Those who have taken part in the development of a new community college campus can tell you of the process, which involves:

. . an educational program

. . site selection

. . selection of an architect

. . financial planning

. . construction planning and programming

. . design

. . actual construction

. . equipment purchase and installation

Perfectly executed, this process will deliver a fine set of facilities with a long life, in the right place, at the right time, and with the capability of being adapted for changes in program and methodology through the years. If you crank in enough mistakes, however, you have a mediocre set of facilities—difficult and expensive to maintain and operate, in the wrong place, late in arriving, and obsolete when completed.

This latter set of possibilities should keep you awake for a few nights to come.

Site Selection

I believe most of you would say that a preliminary educational program is needed as a part of the site selection criteria. *Don't* attempt to select a site without a pretty good idea of the goals and objectives of the college. For example, will emphasis be given to technical programs, perhaps better suited to an urban or fringe-urban site? Will emphasis also be given to community involvement, including walking, or easy public transit accessibility? In other words, *don't* fail to question and test the proposed site in terms of institutional goals and philosophy, even if sites are offered for free!

We can further qualify site selection with another "don't." *Don't* select a final site without having architectural participation. In fact, the architect selected to prepare the master plan is the ideal consultant to help select the site. The reasons for this are obvious.

Finally, *don't* be afraid of spending a few thousand dollars for soil exploration, borings and soil analyses. In fact, sometimes this information is developed on the final two, or possibly three, alternative sites. The information gained will also help in locating individual buildings on the site finally selected, as well as save you money.

How Is the Architect Selected?

This is, of course, no easy task. The number of very competent firms, capable of college planning, is now large and increasing as time passes.

Do try to get a local firm. Give strong consideration to a local firm, mainly because they are on the scene. Another reason for having a local firm is that architects need to have mechanical and structural consultants, and if they, too, are out of town, you have problems on top of problems. But, sometimes the added coordination required with an out-of-town firm can be well worth the effort.

Have a strongly constituted screening board set up a final list of three or four firms for final board of trustee review and selection. This tends to relieve the heat a little.

Finances

Another item on our list is finances. We could probably spend a good deal of time on this factor and continuously learn something new. However, our experience in St. Louis has been that people will willingly support you when the results are there to see. *Do* get started, even in night space in high schools. *Do* build temporary buildings if funds are limited and space is needed. The present enrollment of about 2,600 on one St. Louis campus is in space constructed for $6/sq. ft., with the total building space for the 2,600 students at about 40,000 sq. ft.

Planning and Programming

The range of points for the discussion of planning and programming is wide. It is difficult to know where to start. I believe the goal is one starting point--where do we want to be in our development? Beginning at that point, which is the college facility as master planned, a target date for occupancy may be the goal. Establish a time frame as part of the facility plan, with development phased to enrollment projections which may, in turn, establish intermediate goals and priorities.

We know that actual construction on a project in most parts of the country takes about twelve to fourteen months for a one to three million dollar project and about eighteen months for a four to six million dollar development. Final plans and specifications for this work may take six months and preliminary planning and programming three to four months, perhaps more. So, for a six million dollar facility, from the time that the master plan is approved, and preliminary plans authorized, more than two years may pass even with constant attention, before the facility is a reality. This bars strikes, material problems, and the like.

Thus, within a time frame, the development process is begun. Some financial suggestions you might consider as you begin are:

- . . Establish check points when you and the architect can review cost estimates.
- . . Obtain not only cost estimates but also cash flow projections. The question is, how fast will you need money; when; and in what amounts?
- . . Consider whether or not an investment program with the temporary cash balances is worthwhile.
- . . In predicting speed of construction make the best possible estimate of progress, then reduce it by about 20% for reality.

In the planning and programming stage, take a long, hard look at such interesting details as:

Mechanical Systems. If the current development is part of a larger one, it will be practical to standardize as much equipment as possible for ease of maintenance.

Interior Finishes. The materials in walls and floors may set a standard too high to continue in future buildings, or they may be too austere for the atmosphere you want to create. Look these over carefully with the architect.

Audio-Visual Systems. Now is the time to detail a master plan for audio-visual systems.

Innovations. What unusual things can be done with walls and space arrangements, at no additional cost, to enhance the opportunity to educate? *Do* stand back, take a look at this point. Take still another look at the plans from the student's point of view. How will a student react to the facility? What does it do for the individual, his curiosity, and his intellect? We know that the learning process includes the interaction of human elements with the surroundings and with the group.

We might add to this questioning process the need to have confidence in what you do. Of course, knowledge helps our confidence and that is one great reason to be informed on what is developing.

Take another look. Should you consider a high rise development? *Do* consider this. There is little reason to spread out with small one or two story buildings just because there is plenty of land today. The many benefits of high rise including economy of construction, reduced operating costs, ease of movement, and economy and efficiency of land use should not be thrown away simply to fill up the site.

Design and Construction

In the design and construction phase we enter an area where much can be gained or lost in time and money and, consequently, in the ultimate educational worth of the facility. Decisions to be made include--how large a construction contract can be bid and still attract good competition? How many contractors can work on the site at one time?

Should bids be taken as one lump sum, or should there be separate bids from major subs? You may be bound by state legal requirements in this. If not, then consider the system we have found successful. This involves acceptance of separate bids on general contract work, heating, ventilating and air conditioning work, electrical work, and plumbing work, with award of a single lump-sum contract to the successful general contractor, and with the successful major subcontract bids being assigned to the general contractor. In this way, we have the benefit of coordination by the general contractor, with a single performance bond to the junior college district and with single responsibility for performance.

Equipment and Furniture

In considering design and construction, thought should be given to a most difficult problem--equipment and furniture. *Don't* underestimate the job of putting the right equipment into place at the right time. Take steps to bid the major built-in equipment as early as possible, perhaps even before bidding the building. The reasons for this are probably obvious. The mechanical and electrical service to the equipment can be more accurately determined, hopefully with no building change orders. Equipment does change as equipment plans are being made firm for bidding, with consequential changes in building services after the building construction has started.

Even pertaining to the movable equipment the word is--get started early. Too often equipment and furniture are overlooked or deferred until the latter stages of the development program, and then we sometimes learn that time consuming studies are necessary to develop the equipment layout and specifications.

Budgets for equipment are growing as we add TV and other more sophisticated elements of teaching and learning systems. These costs should be identified early rather than late in order that priorities may be set where equipment budgets are limited. There is also a growing realization of the need to coordinate the furniture with the building so that the desired atmosphere is established.

"Rules of the road" on equipment might read:

. . Educational specifications should include identification of major or basic equipment.

. . The architects should be involved in all stages of furniture and equipment planning to help in creation of the total facility.

. . The earliest budgets should be as specific as possible in regard to equipment and furniture. In too many cases the tendency here is to deal in "costs per square foot" with a non-specific allowance for furnishings and equipment.

. . Like any good plan, however, the equipment budget must be updated as our information gets better.

. . Early planning and budgeting for equipment will enable quality levels to be established and priorities to be set. The establishment of quality levels is extremely important for management of a development program.

Finally, I would ask, "What kind of a staff is available to work with the faculty, with the architects, and with the contractors to carry out the program?" As you know, the tasks are not part-time ones, and adequate staffing must be available early in the game for coordination of facilities planning, equipment planning, and financial planning.

Summary of "Do's and Don'ts"

- The educational program and site selection are related.
- The architect should be available for site selection.
- *Do* establish a plan and a schedule for the development program.
- Establish an estimate of cash flow--a financial master plan.
- *Don't* treat casually the details of interior finishes, but *do* set a standard of excellence with which you can live.
- Establish standards for mechanical systems.
- *Do* establish a master plan for any special systems, such as audio-visual systems. *Do* this in the preliminary planning stage.
- *Do* consider innovations. *Don't* fail to create an environment which lends interest to the campus life.
- *Do* consider high-rise plans, even on large sites.
- *Do* carefully plan the bidding process and avoid separation of responsibilities on construction.
- *Do* plan all equipment early, together with equipment budgets.

In all of this, the institution and the architect must maintain mutual respect and an appreciation of the responsibilities each has in the entire process.

EVALUATING OUTCOMES*

Peter Kamnitzer

This morning we heard that the process of planning, programming and designing has not changed fundamentally in the last five hundred years. The problem facing us today, however, is the vastly greater level of complexity of this process. In the past, client and builder might have been one and the same, or the architect and the builder might have been blended in one person. In contrast, today we are confronted with a profusion of specialists who certainly have added sophistication and knowledge to deal with the increasing complexity, but who also have fragmented the total cycle of planning, programming, designing, building, and using the completed structure. Robert Reed warned us yesterday that programming and designing must not be seen as separated, isolated items. Ezra Ehrenkrantz, with his School Construction Systems Development project, has shown that designing and building can and must become integrated again. Today I want to address myself to the need of completing the total cycle by pointing to the missing link: the evaluation of completed buildings; the comparison of performance with expectation.

Let us look at the present state of affairs. The majority in this room have had ample experience with the planning and designing process. We are making a thousand decisions regarding future performance. We attend numerous meetings; we work hard on planning committees, we are philosophizing; we are dreaming; we get into each other's hair; we fight for our convictions; we make a thousand decisions in this process of program definition. We may want large rooms, for example, to get maximum interaction of people. We may be convinced that a school needs a large common area so that young people can meet in an informal manner. We may create a team teaching center so that teachers can communicate among each other, plan together, and learn from each other. We may, in contrast, suggest individual rooms so that people could concentrate, could isolate themselves, get a sense of individuality, of ownership.

---

*A transcript of a tape recording taken at an informal luncheon talk at the conclusion of the conference.

We may discuss the best level of illumination. We may want to emphasize the mood that we wish to create. We may point to the need for a sense of concentration by means of concentrated light, to create an island of light within a sea of space, or we may urge maximum uniformity of light for greatest efficiency. We may plan or discuss flexibility, size, color, texture or a thousand other aspects that will have an impact on the total environment.

Who ever returns, once a building is completed, to find out whether any of these assumptions were truly valid; whether the decisions made resulted in the expected performance?

We keep making assumptions and we are building assumptions on top of assumptions until we have built a house of cards on top of a house of cards. We have no feedback. We have no assurance, no building up of a backlog of documented experience. In fact, we have a separation between expectation on the one hand and performance on the other.

If we were to discuss this state of affairs with a physical scientist, he would consider it outrageous. If we were to discuss this with a social scientist, I believe he would equally respond with disbelief.

If we architects look at another profession which also combines science and art, the medical profession, we will find that in the practice of his profession the physician experiences the total cycle of diagnosis, cure, and evaluation, even to the degree of performing an autopsy in order to evaluate the validity of a hypothesis. I firmly believe that any profession that deserves the name "profession" must understand that it is imperative that the person working today can stand on the shoulders of the man who worked yesterday. If we fail to understand this, I fear that our profession will be in deep trouble.

What we are engaged in, presently, I would describe as the "build-and-run" syndrome. We have accused the speculative builder of building-and-running. I am not sure that we, ourselves, would be exempt from this accusation. The consultant who was involved and gave his best during the period of program definition has already run to the next job. The architect who was so deeply involved during the design process is, now that the original building is completed, equally involved emotionally with the next assignment. The time cycle of programming, planning, designing, on the one hand, and of the building becoming a reality, a living organism, on the other--that cycle is apparently too long for the architect's temperament. When, two years later, the architect, occupied with his next project, visits the completed structure, he is in danger of experiencing the building as a tourist would. He falls in love with the visual impact of a red chair in front of a blue wall. He gets enamoured with a beautiful pattern of sunshine and shade provided by a tree which he had no part in placing in this particular location. He is prone to evaluate the building in terms of its surface appearance. He will lovingly look at some successful details and will be prone to overlook some of the less fortunate ones.

I have a feeling that we are dealing with an opportunity overload in our culture. I also feel that the mobility aspect of our life, so dear to us in many ways, is partially to be blamed.

Let us look at the present state of the art of evaluation of buildings. The building, once it is a reality, is accepted as a fact. Some like it, some don't. We go through a cycle of euphoria when the building opens and is fresh and clean. The client has more space than he had before; some egos have been massaged by the provision of a corner room with windows on two sides. The "prestige areas" look handsome and receive praise. Then, slowly, very gradually, complaints start rolling in. Usually they are of a rather gross nature. The elevator may not work. Something else may not function. The architect or consultant may hear about it or he may not. Rarely is the architect the beneficiary of a constant flow of performance information. There is practically no feedback except in cases of minor disasters.

Now let us look at the architectural magazines which evaluate buildings. Most of them do a beautiful job of selling the architect's job. Whatever the influence of the advertiser or advertising might be, I do not wish to touch upon here. But I think all of us architects have to be blamed for very happily using these architectural magazines as advertising outlets for our work. Hopefully, we found a good photographer who brings with him a tree branch to hold up in front of the camera in a strategically composed position. Thus the medium of photography becomes the message.

Let us look at the professional critics. Most of them deal with a building as an art object, often in rather esoteric terms. They deal with the form; they do not deal with the building as a living organism. It can be questioned whether a critic must be an analyst. I, personally, believe that in the field of architecture the two are inseparable.

What about criticism in architectural schools? These schools pride themselves on the jury system for evaluation of the students' work. I have made a point of observing quite a few and when I was younger and just a little more angry than I am today, I decided that the level of communication and analysis in an architectural jury can best be described by the analogy of two people engaged in a lively conversation with one of them stating, "I love to go to the theater; particularly Elizabethan theater interests me deeply," whereupon the other person retorts, "But I prefer salami on rye."

Recently, there have been some very good beginnings in the academic field. Researchers are beginning to address themselves to the task of evaluation of buildings and particularly the impact of a new field called "Architectural Psychology" is gradually being felt. Excellent beginnings are being made by researchers who are truly concerned with the impact of environment on people and with the problem of how a building is being used in actuality. Recently, Clare C. Cooper of Berkeley wrote an evaluation of a housing project designed by Vernon DeMars with Lawrence Halprin as the landscape architect. Another study is being conducted by Sim van der Ryn, also from Berkeley, of a student housing project. Some very interesting observations are supplied in these studies on the actual use of buildings by people. In the dormitory study, Sim van der Ryn found that the desks are rarely used for study or writing, but mostly for storage. The bed, on the other hand, is used for studying, for use as a horizontal surface to spread out when doing research, and for storage for the many things for which no space was supplied elsewhere. He reports that girls in the dormitories have a tendency to use the hair dryers three to four times a week, mostly to cut out the outside noise and to gain a feeling of privacy while they're under the hood. He also found some interesting results when he asked people to describe the individual rooms. He reports that girls describe surfaces and boys describe objects.

These are all interesting observations and helpful. The problem is that evaluation of these buildings was done without the benefit of any clear-cut statement of expectations. As far as I know, with the possible exception of Bruce Archer's work in England, there is no published evaluation available which compares performance with expectation. What is needed, then, in my opinion, is a blow by blow comparison, an item by item comparison of performance with expectation, and I am referring to the physical as well as non-physical aspects, the tangible and the intangible, the quantitative as well as the qualitative aspects.

I was very impressed today by Dr. Boyce's description of the quality of life which they expect from their new campus. It is rare that it is so clearly stated and I would urge Dr. Boyce to use this opportunity now that the building is a reality and in operation, to go through his descriptive statement of expectations and to see whether the "interaction" and the "expansiveness" he was speaking of, the "sense of dropping in on a lecture," of "seeing somebody painting or dancing"--whether these expectations are borne out by the facts of reality. What is needed is a feedback into the total cycle of planning, programming, designing, building, and use of the building. The results cannot fail to affect all aspects of this total process.

It is, therefore, my proposal to start evaluation of buildings in three steps of increasing complexity and refinement. The first would be a common sense step. The second would be based on a systems approach but would be satisfied with qualitative judgments. The third would be a systems approach now based increasingly on quantification resulting from continuing research.

Let us start with the common sense step. I would like to see very careful records kept of the entire planning, programming, designing, building, and use process. From the first over-all statement of the client, or educator, or philosopher, down to the last detail, we would keep such careful records that we could later go back and check item by item. It is essential to define not only the *what*, but in all instances the *why* in greatest detail. If we ask for large or for small rooms, let us state *why*. If we say we need flexibility, let us define our assumptions as to the frequency of expected change. With every recommendation, let us give the reason for the expected recommendation. This very simple common sense approach might make a most important beginning. The next step would define a building as a system of sub-systems as interrelated, interacted, and interdependent parts; definition of goals and objectives, definitions of sub-systems, creation of conceptual and mathematical models, measurement of costs and benefits, establishment of criteria for judgment, and finally evaluation.

In the third phase we would use the same approach, but now increasing quantification could be substituted for qualitative judgments as research supplies us with more objective data for measurement.

I have talked about this general approach a few months ago at another conference at UCLA. Some participants pointed out at that time that it was never possible to define everything and that once the building is a reality, many unforeseen things will happen which will change the original assumptions. Therefore, only flexibility would be a workable answer to our problem. I agree whole-heartedly that flexibility is essential. It is essential to permit the arrangement or rearrangement of learning situations. It is essential as an economy measure for multiple-use purposes; it is essential for future educational change. But let us make sure that flexibility does not become an excuse for indecision. It is easy to claim that a perfect, totally flexible system would relieve us of the worries we were discussing here today. Complete flexibility is chaos. In addition to flexibility man needs fixed points; fixed points in a world of flexibility, adaptability, maleability, and, not to forget, anonymity. There is need in man for variety. There is a need for stimulation of the eye and other senses. There is a need for architectural character. There is, at times, also a need for a strong and a dramatic statement. There is a need for images.

Planning, programming, designing, is an art with a scientific base. The art portion in the past has been taken much more seriously than the scientific base. We now must broaden the base making use of all the tools available to us, including systems analysis and design, computers and computer graphics, mathematical and stochastic models. Man gaming simulation can provide us with workable short cuts in the absence of precise data, in addition to providing insight into the decision making process. Environment simulation is made possible by cinematographic simulation, holography, computer graphics, full scale mock ups of spaces. Response can be measured by new insight gained in physiology and environmental psychology. The conceptual, informational, and technological breakthrough of our time has taught the physical, social, and behavioral scientist to develop most useful innovative techniques. Planners and designers have been slow in utilizing the new knowledge, technology, and tools. In contrast, the military and space programs have been pace-making leaders in the application of tested innovations. The challenge is now to apply the same boldness and the same imagination, the same drive, technology and manpower that characterized the space program, to the planning of our environment. It is within our reach to begin to develop simulation laboratories that would simulate the physical and the non-physical aspects of our environment. Such simulation would show the social repercussions of physical man-made change. It would take all components of the environment to equally evaluated stages of development. It would permit testing of hypothetical solutions. It would permit rigorous testing of the creative leap. I believe strongly that unless we have a tool to rigorously test the repercussions, the costs, and the benefits of the creative leaps, we will continue to be tagged as impractical dreamers, or worse, as exterior decorators.

Whatever the tool or the methods, let us make sure that we do not lose sight of the totality of life. The aesthetic-emotional requirements of man must be part of our list of variables. The interaction between people, movement from one activity to another, sequential experience of moving through space, images to be achieved, all this is as essential as the square footage or the room sizes or the number of lockers required. Let us also not forget that form in response to forces has to be evaluated as an important dynamic element capable of generating new forces. Let us be conscious of the interaction of function and form and form and function, and not just look for cause and effect. Let us be aware that invention and innovation are capable of generating new unforeseen activities.

Any systems approach or methodology will supplement, not supplant, the designers'and the decision makers' sensitivity, imagination, intuition. We need both the tangible and the intangible, the predictable and the spontaneous, deduction, induction, and intuition, an if-then statement plus the question mark. We need reason plus emotion—the question posed to us is on what level of knowledge and awareness do we wish to employ these uniquely human qualities?

Let me close with a quotation from E. E. Cummings:

> While you and i have lips and voices which
> are for kissing and to sing with
> who cares if some oneeyed son ot a bitch
> invents an instrument to measure Spring with?

APPENDIXES

APPENDIX A

PROGRAM

MONDAY, APRIL 24

11-12 Registration, Student Union Building (HUB)

12:30 Luncheon, Student Union Building

"Purposes of the Conference"
Raymond C. Schneider, Associate Professor of Architecture,
University of Washington

1:30 FIRST GENERAL SESSION, Student Union Building

Presiding: Robert H. Dietz, Dean,
College of Architecture and Urban Planning,
University of Washington

Planning and Programming: "Its Theory and Future"
Robert H. Reed, Director
Facilities Information Service
American Association of Junior Colleges
Washington, D. C.

2:15 *Design Case Study:* "Bellevue Community College"
David C. Hoedemaker, Project Architect for Bellevue Community College, with Naramore, Bain, Brady and Johanson, Architects, Seattle, Washington
Merle O. Landerholm, President
Bellevue Community College, Bellevue, Washington

3:30 *Questions and Concerns:* Group Discussions

Leader Group 1, Dale L. Bolton,
Associate Professor of Educational Administration,
University of Washington

Leader, Group 2, Lee G. Copeland,
Assistant Professor of Architecture and Urban Planning,
University of Washington

Leader, Group 3, Norman G. Aehle,
Project Architect for Green River Community College,
with Sullam and Aehle, Architects, Seattle, Washington

Leader, Group 4, Gerald C. Pomeroy,
Project Architect for Edmonds Community College,
with Waldron & Dietz, Architects, Seattle, Washington

4:15 The Feedback Loop--End of First General Session

5:30 Social Hour, Sheraton Motor Inn

6:30 Dinner, Sheraton Motor Inn

7:30 SPECIAL SESSION, Sheraton Motor Inn

Presiding: Frederic T. Giles, Professor of Higher Education and Director, Center for the Development of Community College Education, University of Washington

Speaker: Lawrence F. O'Neill, Coordinator of Physical Facilities, The Junior College District of St. Louis-St. Louis County, Missouri--"Do's and Don'ts in Community College Planning"

TUESDAY, APRIL 25

9:00 SECOND GENERAL SESSION, Student Union Building

Presiding: Norman J. Johnston, Assistant Dean, College of Architecture and Urban Planning, University of Washington

Planning and Programming: "Its Tools and Techniques"
Roger Malek, Community College Planning Consultant,
Arthur D. Little, Inc., San Francisco, California

9:45 *Design Case Study:* "Golden West College"
R. Dudley Boyce, President, Golden West College,
Huntington Beach, California
James M. Sink, Project Architect for Golden West College,
with William L. Pereira & Associates, Architects,
Corona Del Mar, California

11:00 *Questions and Concerns:* Group Discussions
Dale L. Bolton
Lee G. Copeland
Norman G. Aehle
Gerald C. Pomeroy

11:45 The Feedback Loop--End of Second General Session

12:30 Luncheon, Student Union Building

Presiding: Gordon C. Lee, Dean, College of Education, University of Washington

Planning and Programming: "Evaluating Outcomes"
Peter Kamnitzer, Associate Professor of Architecture, University of California at Los Angeles

2:15 *Conference Summary:*
Frederic T. Giles

2:30 Adjournment

CONFERENCE ADVISERS

Robert H. Dietz, Dean, College of Architecture and Urban Planning
Richard Haag, Associate Professor of Landscape Architecture
Robert W. Koski, Planning Officer, Long-Range Planning Office
Daniel M. Streissguth, Professor of Architecture
Myer R. Wolfe, Professor of Urban Planning

CONFERENCE COORDINATORS

Frederic T. Giles, Professor of Higher Education and Director, Center for the Development of Community College Education
Raymond C. Schneider, Associate Professor of Architecture

STUDENT ASSISTANTS

Kelly Brandon, Department of Architecture
George Pennell, College of Education
Marvin Sondalle, College of Education

Assisted by
Office of Short Courses and Conferences
Department of Audio-Visual Services
Publications Services

APPENDIX B

CONFERENCE PARTICIPANTS

John Amundson, Architect
P. O. Box F
Springfield, Oregon 97477

Phillip Balsiger, Architect
P. O. Box 188
Wilsonville, Oregon 97077

Donald Burr, Architect
6103 Mt. Tacoma Drive S. W.
Tacoma, Washington 98499

David Burton, Architect
10335 Main Street
Bellevue, Washington 98004

William Cox, Dean of Administration
Lane Community College
Eugene, Oregon 97401

Dr. Ed Erickson, President
Seattle Community College
Seattle, Washington

Steve Forrest, Architect
622 Hemlock Way
Juneau, Alaska 99801

James R. Frost, Dean of Instruction
Grays Harbor College
Aberdeen, Washington 98520

Elton Gildow, Architect
510 Norton Building
Seattle, Washington 98104

Howard Glazer, Architect
1105 N. W. 26th Avenue
Portland, Oregon 97210

Jennings Graham, Architect
Box 544
Ketchikan, Alaska 99901

Harold Hall, Architect
402 Commerce Building
Everett, Washington 98201

George Hartman, Architect
510 Norton Building
Seattle, Washington 98104

Don Hollingberry, Architect
1117 Larson Building
Yakima, Washington 98902

Dr. Herman Jaeger, Superintendent
Grandview School District
Grandview, Washington 98930

Perry Johanson, Architect
905 Seventh Avenue
Seattle, Washington 98104

Fred Koschmann, Resident Director
Juneau-Douglas Community College
Juneau, Alaska 99801

Dr. Harold Lang, President
Lower Columbia College
Longview, Washington 98632

Dr. Melvin Lindbloom, President
Green River Community College
Auburn, Washington 98002

Harry Loners, Architect
P. O. Box 1708
Billings, Montana 59103

Merle Long, Clerk of the Works
Mt. Hood Community College
Gresham, Oregon 97030

Donald Lutes, Architect
Box F, S. Mill Street
Springfield, Oregon 97477

Gale A. McArthur, Architect
1851 Garden
Eugene, Oregon 97403

Dr. Paul McCurley, President
Everett Junior College
Everett, Washington 98201

John W. McGough, Architect
North 120 Wall
Spokane, Washington 99210

Edward Mahlum, Architect
2114 Thorndyke
Seattle, Washington 98199

John E. Mahlum, Architect
2114 Thorndyke
Seattle, Washington 98199

Dr. Leo Marlantes, Dean of
Instruction
Mt. Hood Community College
Gresham, Oregon 97030

Alvin Marsden, Urban Planner
904 7th Avenue
Seattle, Washington 98104

Roy Meiklejohn, Architect
258 Main Street
Penticton, British Columbia
Canada

Dr. Roy Mikalson, President
Clackamas Community College
Milwaukie, Oregon 97222

Hugh S. Mitchell, Architect
1851 Garden
Eugene, Oregon 97403

Christopher Morgan, Architect
725 Country Club Road
Eugene, Oregon 97401

Dr. Don Morgan, President
Big Bend Community College
Moses Lake, Washington 98837

Ray Needham, Dean of Instruction
Green River Community College
Auburn, Washington 98002

Byron Norman, Planning Officer
Edmonds Community College
Lynnwood, Washington 98036

Earl Norman, Dean of Students
Green River Community College
Auburn, Washington 98002

Carlton Opgaard, Dean of Instruction
Edmonds Community College
Lynnwood, Washington 98036

Dr. Marion Oppelt, President
Clover Park Community College
Tacoma, Washington 98499

William Paddock, Architect
1117 Larson Building
Yakima, Washington 98901

Charles Pearson, Architect
4206 N. Lexington
Tacoma, Washington 98407

Dr. Don P. Pence, President
Central Oregon Community College
Bend, Oregon 97701

Robert Price, Architect
4303 Ruston Way
Tacoma, Washington 98402

Richard Rhodes, Architect
725 Country Club Road
Eugene, Oregon 97401

Walter Roberts, Director of
Technical Education
Skagit Valley College
Mount Vernon, Washington 98273

Clarence C. Ross, Architect
814 Dexter Horton Building
Seattle, Washington 98104

Robert E. Sarvis, Director of
Community Services
Edmonds Community College
Lynnwood, Washington 98036

Dr. Omar H. Scheidt, President
Yakima Valley College
Yakima, Washington 98902

John Scott, Architect
2114 Thorndyke
Seattle, Washington 98199

Alan Seder, Architect
725 Country Club Road
Eugene, Oregon 97401

William F. Shawl, Registrar
Highline College
Midway, Washington 98031

James L. Simpson, Resident Director
Ketchikan Community College
Ketchikan, Alaska 99901

Donald F. Slaughter, Manager of
Services
Highline College
Midway, Washington 98031

W. Arthur Slipper
940 Pyrford Road
Vancouver, British Columbia
Canada

Darrell Smith, Architect
725 Country Club Road
Eugene, Oregon 97401

L. Dixon Steinbright, Architect
2114 Thorndyke W.
Seattle, Washington 98199

Arden Steinhart, Architect
1264 Eastlake E.
Seattle, Washington 98102

Dr. William E. Steward, President
Wenatchee Valley College
Wenatchee, Washington 98801

Fred Tampke, Campus Planner
University of Alaska
College, Alaska 99701

Allen Thurmann, Architect
2114 Thorndyke
Seattle, Washington 98199

John Villesvik, Architect
Room 418 Liberty Building
Yakima, Washington 98902

Lawrence Waldron, Architect
215 8th Avenue N.
Seattle, Washington 98109

Norman Walker, President
Okanagan Regional College
Kelowna, British Columbia
Canada

Don Wallace, Architect
10905 S. E. First
Bellevue, Washington 98004

Dr. John H. Wormsbecker, Executive
Assistant: College Administration
Vancouver City College
Vancouver 14, British Columbia
Canada

Dr. Richard White, President
Shoreline Community College
Seattle, Washington 98133